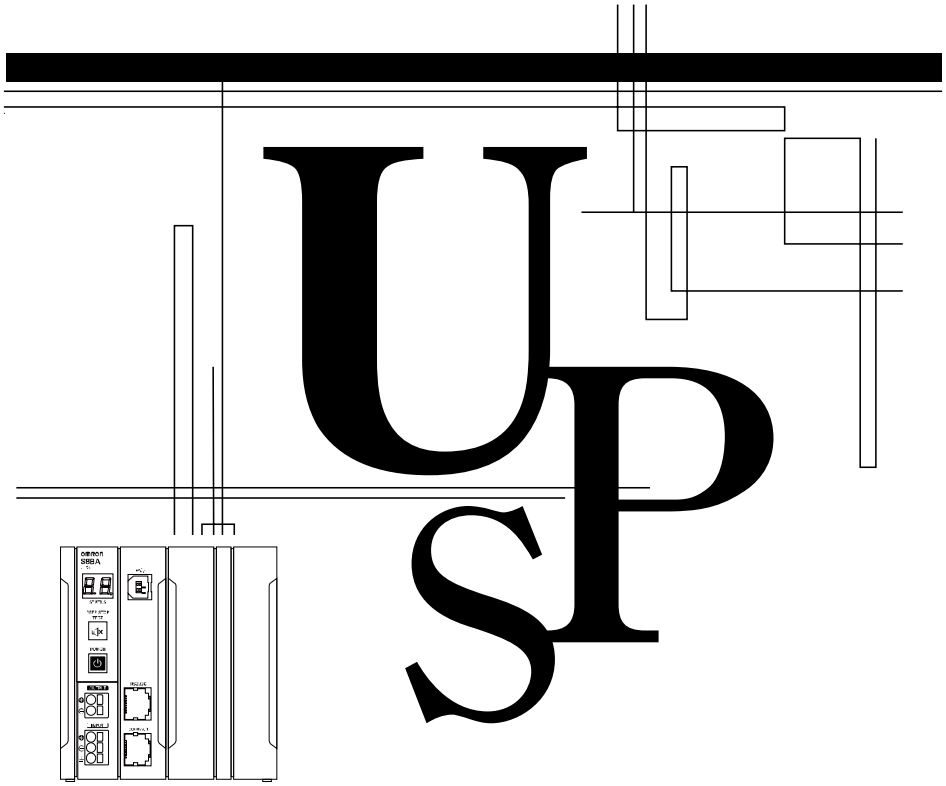
OMRON

Uninterruptible Power Supply (UPS)

S8BA-24D24D□□□LF

User's Manual



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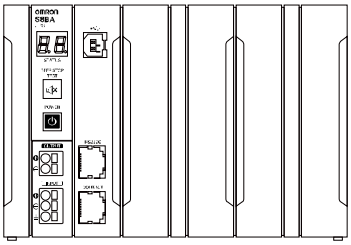

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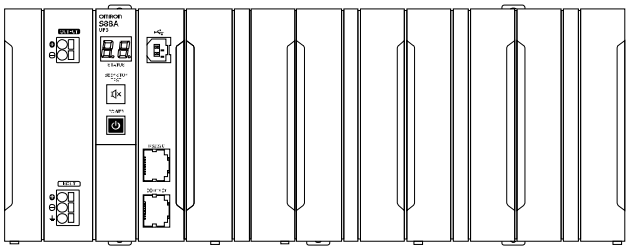


S8BA-24D24D360LF/S8BA-24D24D480LF

Introduction

Thank you for purchasing OMRON's Uninterruptible Power Supply (UPS).

This manual contains information that is necessary to use the “Uninterruptible Power Supply (UPS)”. Read this manual carefully and make sure that you understand the functionality and performance of the product before using it in your system.

Keep this manual in a safe place where it will be available for reference during operation.

Intended audience

This manual is intended for:

Personnel with knowledge of electric systems (the level of knowledge an electrical engineer has or its equivalent) and at the same time

- Personnel in charge of introducing FA systems
- Personnel in charge of designing FA systems
- Personnel in charge of installing and connecting FA systems
- Personnel in charge of managing FA systems and facilities

Applicable products

This manual covers the following products:

- Uninterruptible Power Supply (UPS) S8BA Series
  - S8BA-24D24D120LF
  - S8BA-24D24D240LF
  - S8BA-24D24D360LF
  - S8BA-24D24D480LF

Important notice

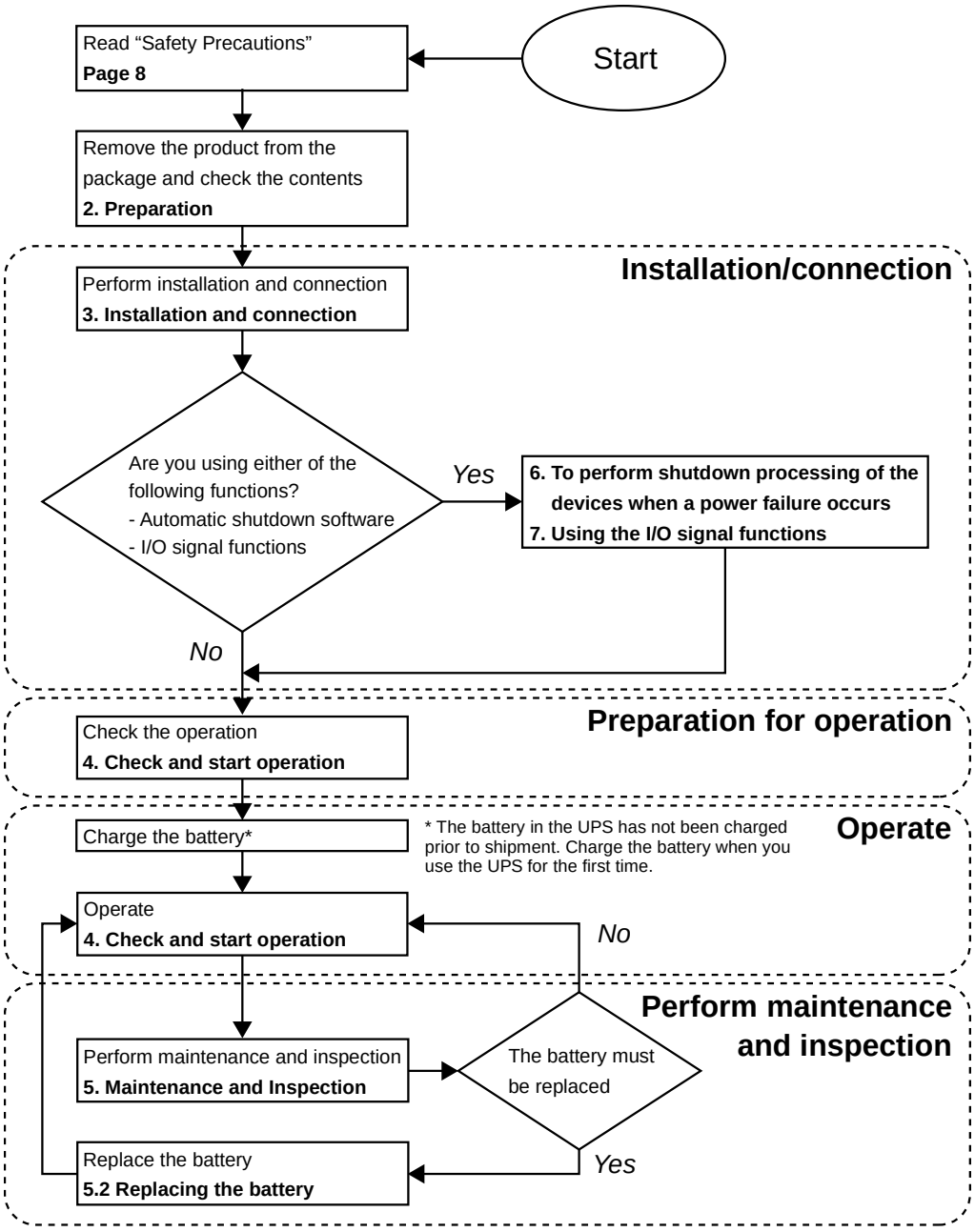
- No part of this manual may be copied, reproduced, or used in any form without our permission.
- Note that the content of this manual such as the specifications is subject to change for improvement without prior notice.
- We have checked the content of this manual and believe it to be accurate. However, if you find any errors or have any questions, contact our sales personnel
  At that time, give the Man. No. (manual number) in the back of your manual.

Trademarks

- System names and product names indicated in this manual are registered trademarks or trademarks of their respective owners.

Procedure from installation to operation

The procedure from installation to operation is shown below.


Start
Read “Safety Precautions”
Page 8
Remove the product from the package and check the contents
2. Preparation
Installation/connection
Perform installation and connection
3. Installation and connection
Are you using either of the following functions?
- Automatic shutdown software
- I/O signal functions
Yes
6. To perform shutdown processing of the devices when a power failure occurs
7. Using the I/O signal functions
No
Preparation for operation
Check the operation
4. Check and start operation
Operate
Charge the battery*
* The battery in the UPS has not been charged prior to shipment. Charge the battery when you use the UPS for the first time.
Operate
4. Check and start operation
No
Perform maintenance and inspection
Perform maintenance and inspection
5. Maintenance and Inspection
The battery must be replaced
Yes
Replace the battery
5.2 Replacing the battery

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Read and understand this manual

Unless otherwise specially agreed upon regarding the “OMRON product”, the terms and conditions described in this chapter shall apply regardless of your place of purchase.

Definition

The definitions of terms in this chapter are as follows:

- “OMRON products”: FA system devices, general-purpose controllers, sensing devices, and electromechanical components of “OMRON”
- “Catalogs and other documents”: Catalogs such as the OMRON Best Controllers and the Electromechanical Components General Catalog, specifications, instruction manuals, and other catalogs and manuals related to “OMRON products”, including those provided in digital form
- “Application conditions”: Conditions written in “catalogs and other documents” related to “OMRON products” such as the usage conditions, ratings, performance, operating environment, operation instructions, notes on usage, and prohibitions
- “Customer's usage”: Use of the “OMRON product” intended by the customer, including embedding or using the “OMRON product” in a component, electronic substrate, device, facility, or system manufactured by the customer
- “Suitability of use”: (a) Compliance; (b) operation; (c) non-infringement of third-party property rights; (d) observance of laws and regulations; and (e) observance of standards regarding the “OMRON product” in the “customer's usage”

Notes on information contained in this manual

For information contained in “catalog and other documents”, note the following:

- Rated values and performance values are values obtained by stand-alone tests under specific conditions. They do not guarantee values that are obtained under complex conditions.
- Supplementary data is provided as reference, not guaranteeing that the unit always operates correctly within the range of such data.
- Usage examples are described as reference. “OMRON” shall not guarantee the “suitability” related to them.
- For improvements and other reasons, “OMRON” may discontinue the production of “OMRON products” or change the specifications for “OMRON products”.

Notes when using the product

To adopt and use the product, note the following:

- Use the unit according to the “application conditions” such as ratings and performance.
- Confirm the “suitability” on your own to determine whether the “OMRON product” can be used for your purpose. “OMRON” shall not be responsible for the “suitability of use” of any kind.
- Be sure to confirm on your own in advance that the “OMRON product” is provided with electrical power and installed properly for the intended use in your entire system.
- To use the “OMRON product”, perform the following items: (i) use of the “OMRON product” with an adequate margin relative to the ratings and performance and safety design such as redundant design; (ii) safety design that minimizes hazards in the “customer's usage” even if the “OMRON product” fails; (iii) formulation of safety measures in the entire system to alert the user; and (iv) periodical maintenance of the “OMRON product” and periodical review of the “customer's usage”.
- “Our product” is designed and manufactured as a general purpose product for use with a general industrial product. It is therefore not intended for the purposes listed below. Should you use “our product” for any of such purposes, we shall not guarantee “our product”. Even for any of such purposes, however, the above is not applicable to cases in which our product is intended for the use with a special product “we” intend and special agreement exists.
  - (a) When a high level of safety is required (such as nuclear control equipment, combustion equipment, aerospace equipment, railway equipment, elevating equipment, entertainment equipment, medical equipment, safety device, and other use that can cause danger to the life or body of a person)
  - (b) When a high level of reliability is required (such as a gas, water, or electricity supply system, 24-hour non-stop operation system, payment system, and other use that handles rights and properties)
  - (c) When the use conditions or environment is severe (such as equipment installed outdoors, equipment susceptible to chemical contamination, equipment susceptible to electromagnetic interference, and equipment susceptible to vibration and impact)
  - (d) When the use conditions or environment is not as written in the “catalog or other documents”
- Besides the purposes described from (a) to (d) above, “the product described in this catalog or other documents” is not intended for vehicles (including two-wheel vehicles, and the same applies hereafter). Do not install this product in a vehicle. For products to be installed in vehicles, consult with our sales personnel.

Warranty conditions

The warranty conditions for the “OMRON product” are as follows:

- Warranty period: For a period of 1 year from the date of purchase
  (Unless otherwise described in “catalog or other documents”)
- Warranty: Any of the following shall be performed on a faulty “OMRON product” at the discretion of “OMRON”.
  (a) In-warranty repair of a faulty “OMRON product” at an OMRON maintenance service center (note that repair is not applicable to electromechanical components.)
  (b) Supply of as many replacement products as the number of faulty “OMRON products” without charge
- Outside warranty: If the cause of the failure is any of the following, the failure shall be out of the scope of warranty.
  (a) Use other than the originally designed use of the “OMRON product”
  (b) Use not compliant with the “application conditions”
  (c) Use against “Notes when using the product” in this chapter
  (d) Modification and/or repair not carried out by “OMRON”
  (e) Software program introduced not by “OMRON”
  (f) Anything that could not be predicted considering the level of science and/or technology at the time of shipment from “OMRON”
  (g) Cause besides the above not attributable to “OMRON” or “OMRON products” (including force majeure such as disasters)

Limitations of liability

The warranty described in this chapter covers all the warranty related to the “OMRON product”.

“OMRON” and distributors of “OMRON products” shall not be responsible for any damage that occurs and is related to “OMRON products”.

Export controls

To export or provide to non-residents of Japan “OMRON products” or their technical documents, observe the laws and regulations of Japan and other related countries regarding security and export controls. Should you violate any laws or regulations, “OMRON products” or their technical documents may not be provided.

Safety precautions

Important information for safe operation is described.
Be sure to read it before installation and start of use.
The safety symbols and their meaning used in this manual are as follows:

⚠Warning	**If you fail to use the product properly, it may result in injuries, mild or moderate, and may lead to death. Additionally, there may be severe property damage.**
⚠Caution	**If you fail to use the product properly, it may result in injuries, mild or moderate, or damage on property.**

*Property damage means damage to houses/household effects, livestock, and pets.

	●General inhibition Notice prohibiting an unspecified general action.
	●General instruction Notice instructing an unspecified general action.
	●Do-not-disassemble prohibition Notice prohibiting disassembly because disassembling the device may cause such an accident as an electric shock.
	●Prohibition of use in locations subject to water such as a bathroom and shower room. Notice prohibiting installation of the device in locations subject to water, because if a device not made water-proof is used in such locations, injury may occur due to an electric leak.
	●Do-not-touch prohibition Notice prohibiting touching the device because touching a certain part of the device under certain conditions may result in injury.
	●Explosion alert Notice alerting the user to the possibility of explosion under certain conditions.

Note that events categorized as a caution required matter also may cause more serious results under certain conditions. The information described here is very important and must be strictly observed.

⚠Warning (for use of this product)

Provide safety measures outside the UPS to ensure safety in the entire system even if the UPS is damaged or an abnormality occurs due to an external factor. Not doing so may result in serious accidents due to incorrect operation.

⚠Caution (for installation and connection)

Carry the unit considering its weight and balance, and place it on a stable and robust base.

- If you drop the unit, the battery or the battery protection mechanism may be broken, and it may result eventually in a fluid leak, abnormal heating, smoke, rupture or fire.
- If you drop the unit, stop using it and have it inspected and repaired. For repair, contact our sales personnel.

Keep plastic package bags out of reach of children.

- Children may suffocate if they place their heads into plastic bags.

Make sure to connect the "input power supply" to the DC power supply device with a rated voltage (DC24V).

- The input voltage ranges for the UPS are as shown below. Check that the output voltage of the DC power supply device connected to the input terminal of the UPS is within any of the voltage ranges below.
  - DC24V±10% (Input sensitivity setting: When standard sensitivity is set)
  - DC24V±12.5% (Input sensitivity setting: When low voltage sensitivity is set)
  - DC±5% (Input sensitivity setting: When high voltage sensitivity is set)
- Connecting to a DC or AC power supply device with a different voltage may result in malfunction in or damage to the UPS, or cause a fire.

When an abnormality (unusual sound or smell) occurs, turn OFF the unit's "Power" switch to stop the output, and stop the supply of commercial power.

- When performing maintenance on the connected devices, follow the above instructions to ensure safety.

When installing the input cable, make sure to perform the connection as specified.

Make sure to stop the primary power supply before connecting the unit to the input power supply terminal.

- When connecting a cable to the terminal block, use a cable that complies with the input current specification of the UPS. Failure to do so may result in electric shock or ground fault.

Do not disassemble, repair, or modify the unit.

- Doing so may cause an electric shock or a fire.

⚠Caution (for installation and connection)

Do not install the unit in other than specified orientations.

- Dropping or toppling the unit may cause injury.
- If you install the unit in an orientation other than specified, the internal temperature may rise, eventually damaging the UPS or deteriorating the battery.

Do not use the unit where the maximum temperature exceeds 55℃.

- The battery deteriorates rapidly.
- If the battery's resin separator is damaged, the battery may be short-circuited inside, and may cause an abnormal heating, smoke, rupture or fire.
- Doing so may cause a failure or malfunction of the unit.

Do not exceed the ranges specified for environmental conditions during use/storage.

Do not install or store the unit in the places listed below.

- Do not store in places where the humidity is lower than 10% or higher than 90%.
- Do not use the unit in places where the ambient temperature is lower than 0℃ or higher than 55℃. (With no condensation)
- Do not use in places where the humidity is lower than 10% or higher than 90%.
- Do not install/store the unit in closed places such as cabinets with no clearance, places where there is flammable or corrosive gas, places with large amounts of dust, places exposed to direct sunlight, places exposed to shock or vibration, salty or wet places, or outdoors.
- Installation or storing the unit in such a place may cause a fire.

When you use plug strip and other plugs to connect additional devices, do not connect devices that exceed the current capacity of the available plugs.

- The current protection of the unit may operate, which may stop the output.
- The cable heats up, which may cause a fire.

Do not pinch or sharply bend the cable.

Do not fold or knot the cable.

- Doing so may cause the cable to be damaged or heated, which may cause an electric shock or a fire.
- If the cable is damaged, stop using the unit and have the cable repaired.
- For repair, contact our sales personnel.

Do not connect any devices other than rated voltage is DC24V.

- The rated output voltage of this unit is DC24V.
- Overvoltage or overcurrent may damage the connected devices.

All of the included accessories are designed to be used with the unit. Do not use the accessories with other devices.

- Doing so may compromise the safety of devices.

⚠Caution (for installation and connection)

Include a breaker between the "input power supply" of this unit and the DC power supply device. And install the breaker where it is easy to operate.

When this product is used in compliance with CE marking, please use under 2m communication cable.

Do not block the air vents (upper and lower).

- Doing so will cause the internal temperature to rise, which may cause the unit to fail and the battery to deteriorate.
- For stationary installation, leave a space of 50 mm or more above the top, and for installation using a DIN rail and screw clamps, leave a space of 50 mm or more above the top and below the bottom each..

Do not connect the RS232C port or the CONTACT port to a LAN device using a LAN cable.

- Connection to a LAN device may result in malfunction in or damage to the UPS or the LAN device.

⚠Caution (for use)

Do not allow the unit to come in contact with water.
If you drop the unit, stop using it.

- Doing so may cause an electric shock or a fire.
- Doing so may cause an abnormal heating, smoke, rupture, or fire on the battery.
- If the unit becomes wet or is dropped, immediately stop using it, disconnect the input power supply from the wall outlet (commercial power source) and have it inspected and repaired.
- For repair, contact our sales personnel.

When the battery is dead, replace it immediately or stop using the unit.

- Continuing the use of it may cause fire or electric shock due to liquid leaks.

Ambient temperature	Expected life
50℃	2.5 years
40℃	5 years
25℃	10 years

*The values in the table are the expected life under standard use conditions and are not guaranteed.

Occasionally, wipe off dust on the input terminal block and the output terminal block with a dry cloth.

- Accumulated dust may cause a fire.
- Before wiping off dust, stop all connected devices and the unit, and stop the supply of commercial power.

⚠Caution (for use)

Do not use the unit in a closed place and do not cover the unit.

- Doing so may cause abnormal heating or a fire.

If you notice something unusual such as abnormal sound or smell, discoloration, deformation, and heating, turn OFF the unit's "Power" switch to stop the output and stop the supply from the "input power supply".

- Using the unit under such conditions may cause an abnormal heating, rupture or fire.
- If you notice such a condition, stop using the unit and contact our sales personnel for inspection and repairs.
- A readily accessible disconnect device shall be incorporated external to the equipment.

If fluid leaks from the interior, do not touch the fluid.

- Doing so may cause blindness or burns.
- If the fluid contacts your eyes or skin, wash it out with lots of clean water and consult your doctor. The fluid may damage your eye if your eye is left untreated.

Do not place any objects on the unit, and do not drop heavy objects onto the unit.

- Doing so may cause distortion/damage to the case or a failure of the internal circuit, which may cause a fire.

The unit is equipped with a bypass circuit which is able to supply electric power to connected devices even when the inner control circuit is broken down by defects or malfunctions.
If you want to stop the output, stop the source of the "input power supply".

- Output is continuing even when all indicators of the front panel are off.
- Output ON/OFF cannot be controlled with the "Power" switch on the front panel.

When charging the battery, if the battery cannot be charged completely even after the predetermined charging time, turn OFF the "Power" switch of the unit to stop charging the battery.

- Otherwise, it may cause an abnormal heating, smoke, rupture or fire on the battery.

⚠Caution (for maintenance)

When maintaining the connected equipment, turn OFF the unit's "Power" switch to stop the output, and stop the supply of the "input power supply".

- Even if the input power supply to the UPS is stopped while it is in operation, the power output of his unit does not stop and power is supplied from the battery.

⚠Caution (for maintenance)

Do not disassemble, repair, or modify the unit.

- Doing so may cause an electric shock or a fire.

If fluid leaks from the interior, do not touch the fluid.

- Doing so may cause blindness or burns.
- If the fluid contacts your eyes or skin, wash it out with lots of clean water and consult your doctor.

Do not throw the unit into fire.

- Since the battery is incorporated in the unit, the insulator may melt, the gas exhaust valve or protection mechanism may be damaged, or the electrolyte may catch fire, and it may result eventually in an abnrormal heating, smoke, rupture or fire.

Do not insert metal objects into the input terminal block and the output terminal block of the UPS.

- Doing so may result in electric shock.

Do not insert metal objects into the battery connectors.
Do not short between the connector terminals.

- Doing so may result in electric shock.
- The battery's protection board may be damaged due to a short-circuit.

⚠Caution (for battery replacement)

Risk of explosion if battery is replaced by an incorrect type.

- Not doing so may cause a fire.
- Battery pack for; product model: S8BA-B120L.

Do not replace the battery in a place where there is flammable gas.

- Spark may occur when connecting the battery, which may cause an explosion or fire.

If fluid leaks from the battery, do not touch the fluid.

- Doing so may cause blindness or burns.
- If the fluid contacts your eyes or skin, wash it out with lots of clean water and consult your doctor.

Do not disassemble or modify the battery.

- A safety mechanism and protection mechanism to prevent danger are embedded into the battery. If they are damaged, it may cause an abnormal heating, smoke, rupture or fire on the battery.

⚠Caution (for battery replacement)

Do not drop the battery and do not expose it to strong impact.

- Doing so may cause a leakage, abnormal heating, smoke, rupture or fire on the battery. And, if the battery's protection mechanism is broken, the battery may be charged at an abnormal current or voltage, an abnormal chemical reaction may occur inside the battery, and it may result eventually in an abnormal heating, smoke, rupture or fire.

Do not short the battery with metal objects.

- Doing so could cause an electric shock, fire or burn.
- Some electrical energy still remains inside the spent battery.

Do not dispose of batteries in a fire.

- The insulator inside the battery may melt, the gas exhaust valve or protection mechanism may be damaged, or the electrolyte may catch fire, and it may result eventually in abnormal heating, smoke, rupture or fire.

Do not use a new battery and an old battery at the same time.

- The battery may be excessively discharged while being used or excessively charged while being charged, an abnormal chemical reaction may occur inside the battery, and it may result eventually in an abnormal heating, smoke, rupture or fire.
- A battery can present a risk of electrical shock and high short circuit current.
- Contact with any part of a grounded battery can result in electrical shock.
- The following precautions should be observed when working on batteries:
  - (a) Remove watches, rings, or other metal objects.
  - (b) Use screwdrivers with insulated handles.
  - (c) Wear rubber gloves and boots.
  - (d) Do not lay tools or metal parts on top of batteries.
  - (e) Remove battery grounds during installation and maintenance to reduce likelihood of shock. Remove the connection from ground if any part of the battery is determined to be grounded.

Dispose of or collect (recycle) the battery according to your own rules set for that purpose or as instructed by laws and regulations.

- Do not dispose of it in fire. Otherwise, it could explode.

Notes

■ Before using

Charge the battery soon after purchasing the unit.

- If you do not use the unit for a long time after the purchase, the battery may deteriorate and the battery may become unusable.
- Connect this unit to the input power supply and turn ON the “Power” switch to charge the battery.

When moving the unit from a cold place to a warm place, leave it for several hours before using it.

- If the unit is promptly turned ON after being moved to a warmer place, condensation may form inside the unit and cause it to fail.

Take measures for handling unforeseen accidents, such as data backup and system redundancy.

- The output may stop when there is failure in this unit.

■ Connecting

Do not short the output lines of the unit to each other, and do not short the output lines to the ground.

- The unit may fail.

In the event you transfer or sell this unit to a third party, please include all of the documentation that came with the unit. This is to ensure that the unit is used in line with the conditions described in the included documentation.

- This manual contains important safety-related information. Please read and understand the contents of the manual before beginning operation. If this manual is misplaced, download the manual from our website.

■ Using

Before stopping the input power supply to the unit, turn OFF the "Power" switch of the unit.

- The unit enters Battery Mode when input power supply is stopped.
- If the frequency of backup operation becomes high, the battery life may be significantly reduced.

Do not use for an application that frequently requires Battery Mode.

- The battery will deteriorate and fail to maintain the specified backup time.

If you want the UPS to stand by in a UPS startup state, set 3 months or less for the input power supply stop period.

- This UPS startup state means either of the following states:
  (a) A state of waiting for startup triggered by a remote ON/OFF or BS signal.
  (b) A state of waiting for startup when cold start is enabled.
- If the UPS is left unused in the above state for 3 months or longer, the battery goes into overdischarge state, and the backup time may become shorter or the battery may become unusable.

■ Storing

Storing the battery in UPS for a long term, store at an environment less than 25℃ and recharge 10 to 15 minutes the battery within 1 year.

- The battery self-discharges even when it not being used, and it goes into overdischarge state if it is left for a long period of time. The backup time may become shorter or the battery may become unusable.
- We recommend keeping the temperature 25℃ or less when storing the unit for long periods of time.
- Turn OFF the unit's "Power" switch when storing it.

Do not install or store the unit in a place exposed to direct sunlight.

- The rise of temperature may cause the built-in battery to deteriorate rapidly and become unusable.

Regulations and standards

Use overseas

To export (or provide to non-residents of Japan) a model of this product that is categorized as a merchandise (or technology) requiring the export permission and approval stipulated by the Foreign Exchange and Foreign Trade Law, the export permission and approval (or service transaction permission) in accordance with the said law are required.

Conformance to EC Directives

●Applicable directives

- EMC Directives

●Principles regarding conformance

OMRON electronic devices that comply with EC Directives also conform to the related EMC standards so that they can be more easily built into other devices or the overall machine. The actual products have been checked for conformity to EMC standards*.

Whether the products conform to the standards in the system used by the customer, however, must be checked by the customer. EMC-related performance of the OMRON devices that comply with EC Directives will vary depending on the configuration, wiring, and other conditions of the equipment or control panel on which the OMRON devices are installed. The customer must, therefore, perform the final check to confirm that devices and the overall machine conform to EMC standards.

*Applicable EMC (Electromagnetic Compatibility) standards are as follows: EMS (Electromagnetic Susceptibility): EN 61000-6-2, EMI (Electromagnetic Interference): EN 61000-6-4, and EN 61000-6-4 Radiated emission: 10-m regulations

●Conformance to EC Directives

This product complies with EC Directives. To ensure that the machine or device in which the this product is used complies with EC Directives, the product must be installed as follows:

- This product must be installed within a control panel.
- You must use reinforced insulation or double insulation for the DC power supply connected to this product.
- Models of this product that comply with EC Directives also conform to the Common Emission Standard. Radiated emission characteristics (10-m regulations), in particular, may vary depending on the configuration of the control panel used, other devices connected to the control panel, wiring, and other conditions. Therefore, even when using a model of this product that complies with EC Directives, you must confirm and ensure the compliance to EC Directives of the entire machine or equipment.
- This is a Class A product (for industrial environments). In a residential environment, it may cause radio interference. If radio interference occurs, the user may be required to take appropriate measures.

●Conformance to UL

- This product must be installed within a control panel with an internal heater or other unit to protect against the formation of condensation (Standard mounting only).
- Gaps in the door to the control panel must be completely filled or covered with gaskets or other material.
- For use as a UL compliant device, the specifications for S8BA-24D24D480LF are as follows:
  - Maximum input current: 20A
  - Rated output current/capacity: 16.7A/400W
- For use in Pollution Degree 2 Environment.
- Surrounding Air Temperature, 55℃.
- Make sure to connect the device with Class 2 output to the USB port.

1 Overview of the product

1-1 Features of this product

- The Uninterruptible Power Supply (UPS) protects such devices as PLC and IPC* from power failures, voltage variations, and instantaneous voltage drops.
- Under normal conditions, the UPS outputs DC24V of electrical power from the DC power supply as-is. When an abnormality is detected in the DC24V power supply such as a power failure and voltage variation, the UPS switches to battery supply to continue to provide DC24V of electrical power.
- For the specifications of PLC and IPC for power supply input and operation in the event of momentary power interruptions, check the respective manuals.
  *IPC: Industrial PC (Industrial use computer)

1-2 Specifications

Description		Capacity	120W	240W	360W	480W※6
DC input	Rated input voltage		DC24V			
	Input voltage range	When standard sensitivity is set)	DC24V±10%			
		When low voltage sensitivity is set	DC24V±12.5%			
		When low voltage sensitivity is set	DC24V±5%			
	Input maximum current	for rated input voltage	5.9A	11.7A	17.5A	23.3A※4
	Input terminal		Push-in Terminal block			
	Input protection		Fuses			
	Input protection capacity		10A	15A	30A	
	Inrush current		12A or less 0.1ms or less	14A or less 0.1ms or less	16A or less 0.1ms or less	
DC output	Rated current	for rated output voltage	5A	10A	15A	20A※5
	Switching time		Uninterrupted			
	Output voltage	Normal operation	Output of input voltage as-is			
		Backup operation	24V±5%			
	Output terminal		Push-in Terminal block			
	Overload protection		Alarm display at a load level of 110% or over (Normal operation)			
			Alarm display at a load level of 110% or over, output voltage drop (Backup operation)			
			Alarm display cancellation at a load equal to or below the rated capacity (Normal operation, Backup operation)			
Battery	Type		Lithium-ion battery			
	Rated voltage		DC14.4V			
	Rated capacity		1600mAh×1 parallel	1600mAh×2 parallel	1600mAh×3 parallel	1600mAh×4 parallel
	Expected battery life*1		10 years (25℃), 5 years (40℃), 2.5years (50℃)			
	Replacement by user		Yes (Hot swapping)			
	Auto battery check function		Yes			
	Battery life counter function		Yes			
	Charging time		4hours※7			
	Backup time (25℃, initial characteristics)		6min.			
Structure	Dimensions (W×D×Hmm)		94×100×100	148×100×100	270×100×100	
	Weight of unit		Approx. 0.8kg	Approx. 1.3kg	Approx. 2.0kg	Approx. 2.3kg
	Cooling method		Natural cooling			
Environment	Operating ambient temperature/humidity		0℃～55℃／10%～90%RH with no condensation			
	Storage ambient temperature/humidity		－20℃～55℃／10%～90%RH with no condensation			
	Vibration resistance		JIS C 60068-2-6 compliant／5～8.4Hz amplitude: 3.5mm, 8.4～150Hz acceleration rate: 9.8m/s^2／X, Y, and Z directions: 100min. (Sweep time: 10min.×Sweep count 10 times＝Total: 100min.)			
	Shock resistance		JIS C 60068-2-27 compliant: 147m/s^2／X, Y, and Z directions three times			
Insulation and withstand voltage	Voltage resistance		Between DC external and GR terminals: AC1000V 50/60Hz 1min. ／Leak current: 10mA or less			
	Insulation resistance		Between DC external and GR terminals: 20MΩ or more (Using a 500 VDC megger)			
Compliance to standard	Safety standard		UL508／CE／C22.2 No.107.1-01			
	EMI	Radiated disturbance electromagnetic field strength	EN61000-6-4			
Internal power consumption (normal*2 / maximum*3)			7W／22W	11W／41W	14W／60W	18W／80W
Serial communi-cation	RS232C (Interface terminal)		Yes (RJ45)			
	USB (Interface terminal)		Yes (B connector)			
I/O signal			Yes (RJ45)			

*1 An estimated value for standard mounting. Not a guaranteed value.

*2 Conditions: With rated loads connected, at a rated input voltage, and with the battery fully charged.

*3 Conditions: With rated loads connected, at a rated input voltage, and at the maximum battery charging current.

*4 20A for use as a UL compliant device.

*5 16.7A for use as a UL compliant device.

*6 400W for use as a UL compliant device.

*7 When using in an environment at a high temperature, charging may be paused by charging temperature protection, then the charging time will be longer than specified time.
"CS" will be displayed when charging temperature protection is operated.

2 Preparation

2-1 Unpacking the product

Open the package box and take out the UPS and accessories.

Caution for installation and connection

Carry the unit considering its weight and balance, and place it on a stable and robust base.

- If you drop the unit, the battery or the battery protection mechanism may be broken, and it may result eventually in a fluid leak, abnormal heating, smoke, rupture or fire.
- If you drop the unit, stop using it and have it inspected and repaired. For repair, contact our sales personnel.

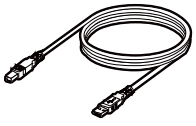
2-2 Checking the contents

Check whether all the package contents are included and there is no damage found on their appearance. If you should notice defects or anything wrong, contact our sales personnel.

■ Accessories related to the main unit

Description	Quantity
Instruction manual	1
USB cable	1

Instruction manual

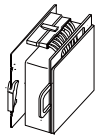


USB cable

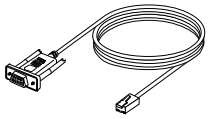
■ Related products

Description	Model number
Replacement battery pack	S8BA-B120L*
Connection cable (RS232C)	S8BW-C01
Connection cable (CONTACT)	S8BW-C02

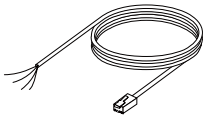
* Battery pack (S8BA-B120L) information:
  ・Rated voltage: DC14.4V
  ・Rated capacity: 1600mAh
  ・Weight: 0.3kg



Replacement battery pack



Connection cable (RS232C)



Connection cable (CONTACT)

2-3 Name of each part

This section describes the name of each part of the UPS.

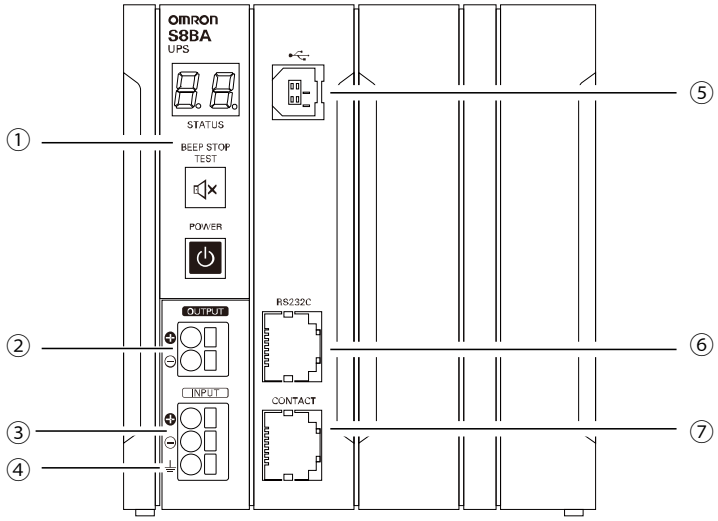
For information on the function of each part, refer to “2 Preparation” and “3 Installation and connection” that provides the details.

■ Meanings of the symbols

I	Indicates that the power is turned ON.
○	Indicates that the power is turned OFF.
	Indicates that the beeper is stopped.
	Indicates the noise-resistance improved grounding.

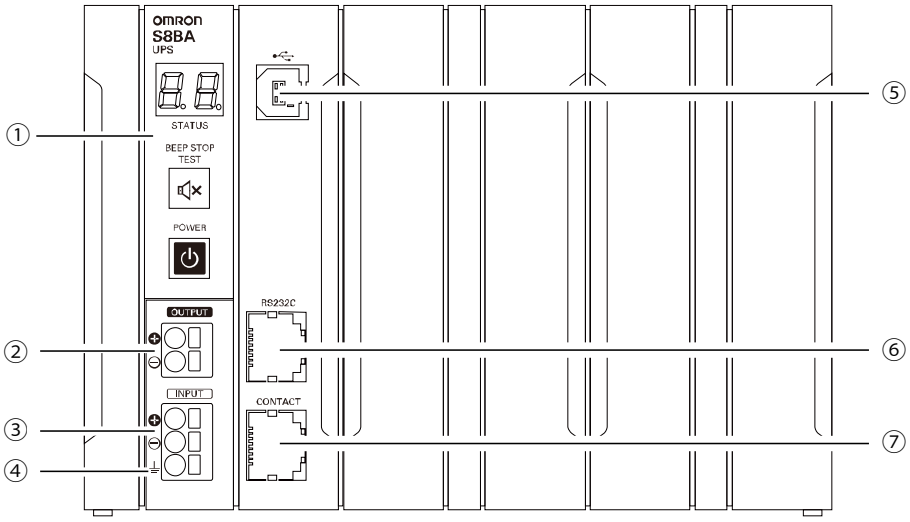
■ Front view

● S8BA-24D24D120LF



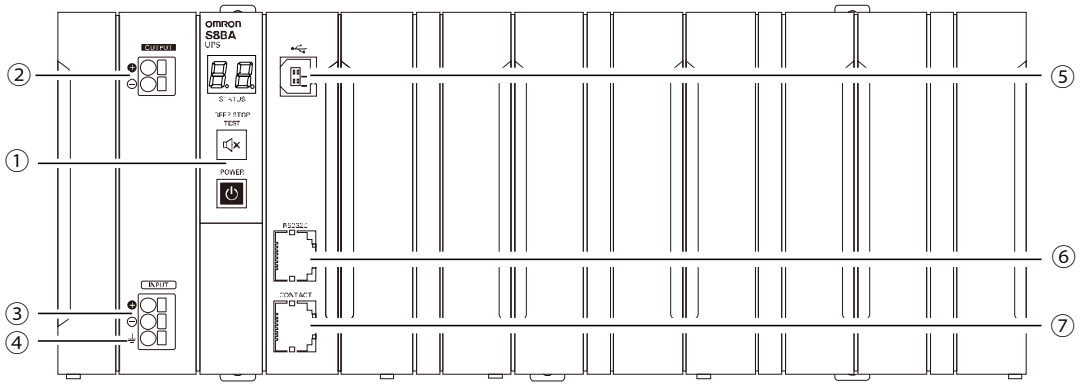
①Operation panel
②DC output terminal block
③DC input terminal block
④GR terminal(⏚)
⑤USB port
⑥RS232C port
⑦CONTACTport

● S8BA-24D24D240LF



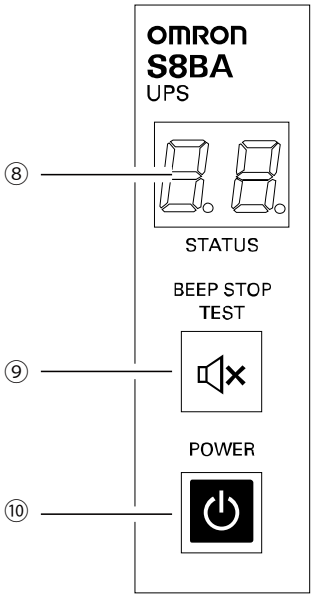
①Operation panel
②DC output terminal block
③DC input terminal block
④GR terminal(⏚)
⑤USB port
⑥RS232C port
⑦CONTACTport

● S8BA-24D24D360LF/S8BA-24D24D480LF



①Operation panel
②DC output terminal block
③DC input terminal block
④GR terminal(⏚)
⑤USB port
⑥RS232C port
⑦CONTACTport

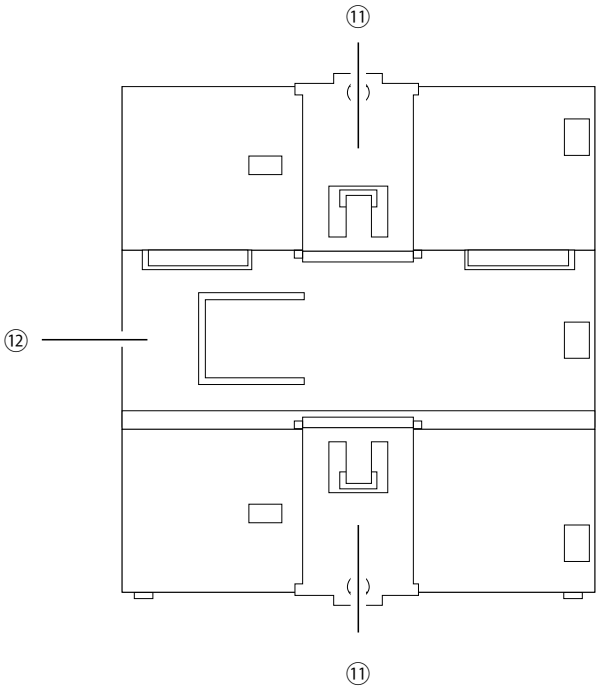
■ Enlarged view of the operation panel



⑧“Status indicator” digital indicator (Green)
⑨“Beep Stop/Test” switch (Black)
⑩“Power” switch (Gray)

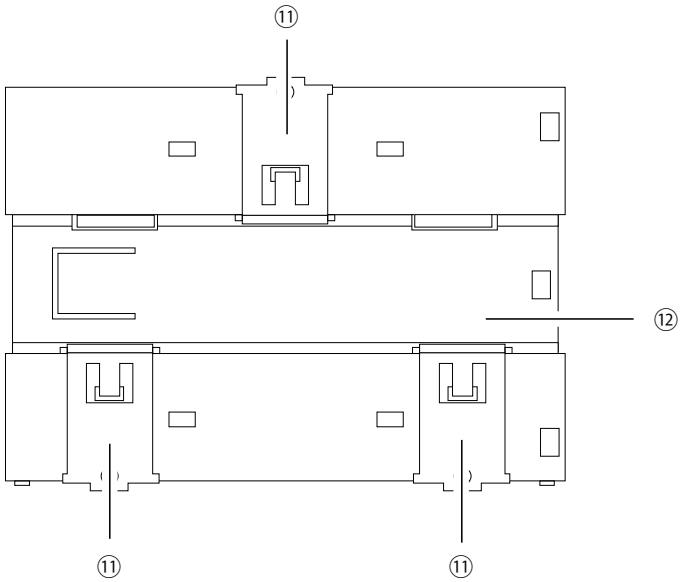
■ Rear view

● S8BA-24D24D120LF



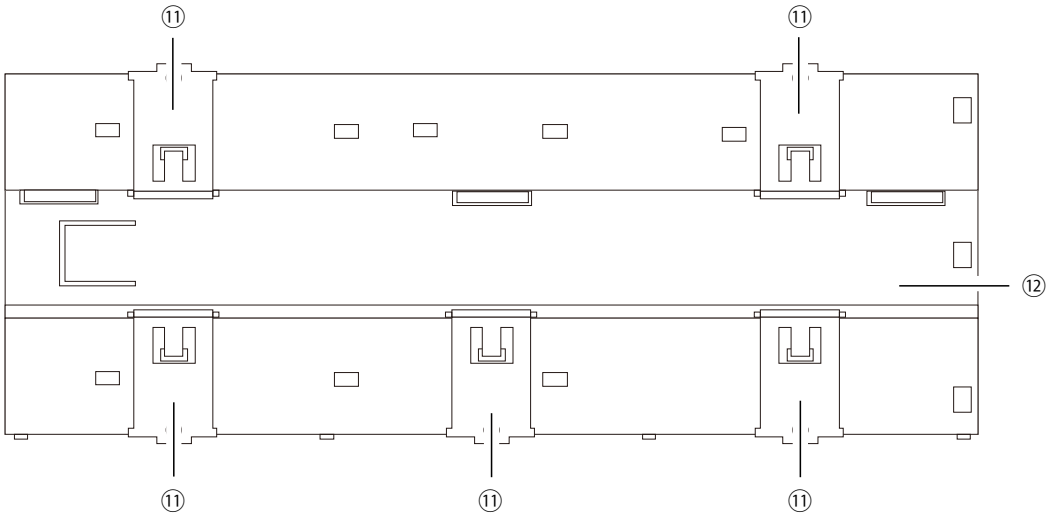
⑪DIN rail mounting hook
⑫DIN rail mounting groove

● S8BA-24D24D240LF



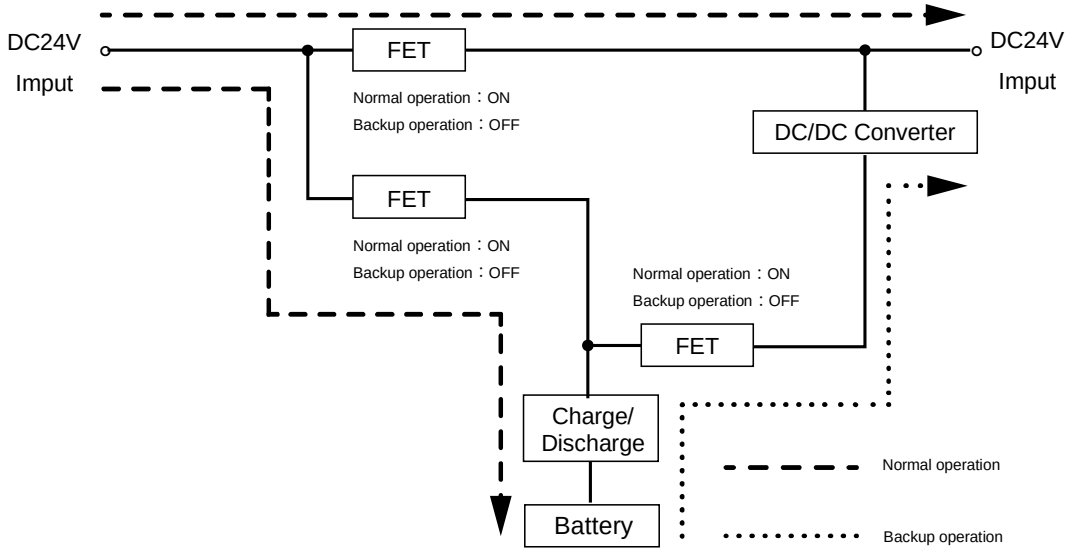
⑪DIN rail mounting hook
⑫DIN rail mounting groove

● S8BA-24D24D360LF/S8BA-24D24D480LF



⑪DIN rail mounting hook
⑫DIN rail mounting groove

2-4 Diagram of the Input/output circuit block



*In normal operation, 24 VDC is output as-is for charging the battery and from the input power supply.
If the 24 VDC from the input power supply becomes lower, the operation automatically switches to backup operation, and 24 VDC is output from the battery.

3 Installation and connection

3-1 Installation

This section describes how to install the UPS.

For cautions when installing the UPS, refer to “Caution (for installation and connection)” shown in the “Safety precautions” of the beginning of this manual.

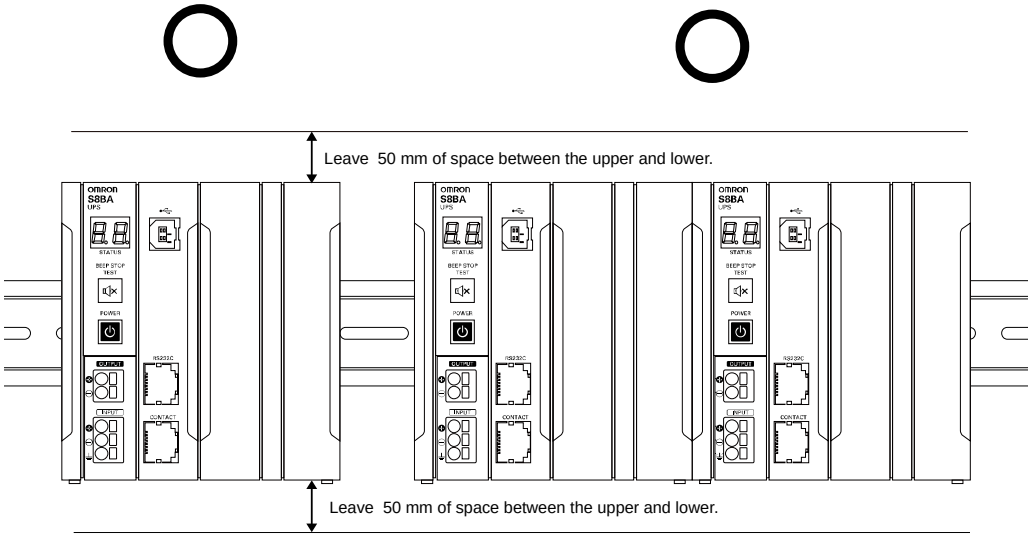
The UPS permits the following installing methods. Choose the one best suited for the environment.

Notes

Before installing this device, make a record of the serial number of this device. The product serial number is required when contacting us about the device.
The product serial number is written on the sticker attached to the side of the UPS.

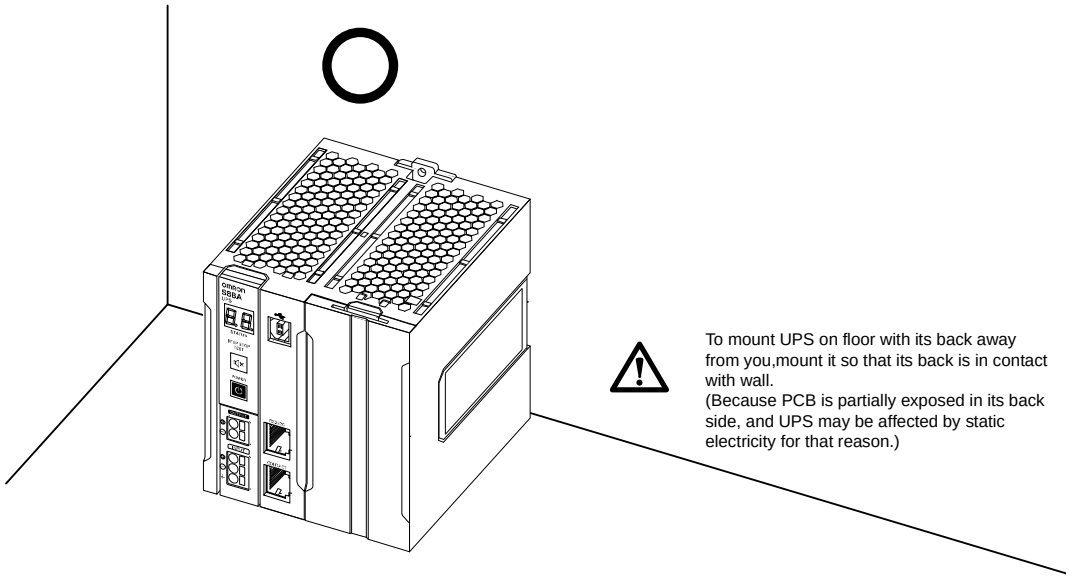
■ Correct positions

● Standard mounting (Mounting to the DIN rail)



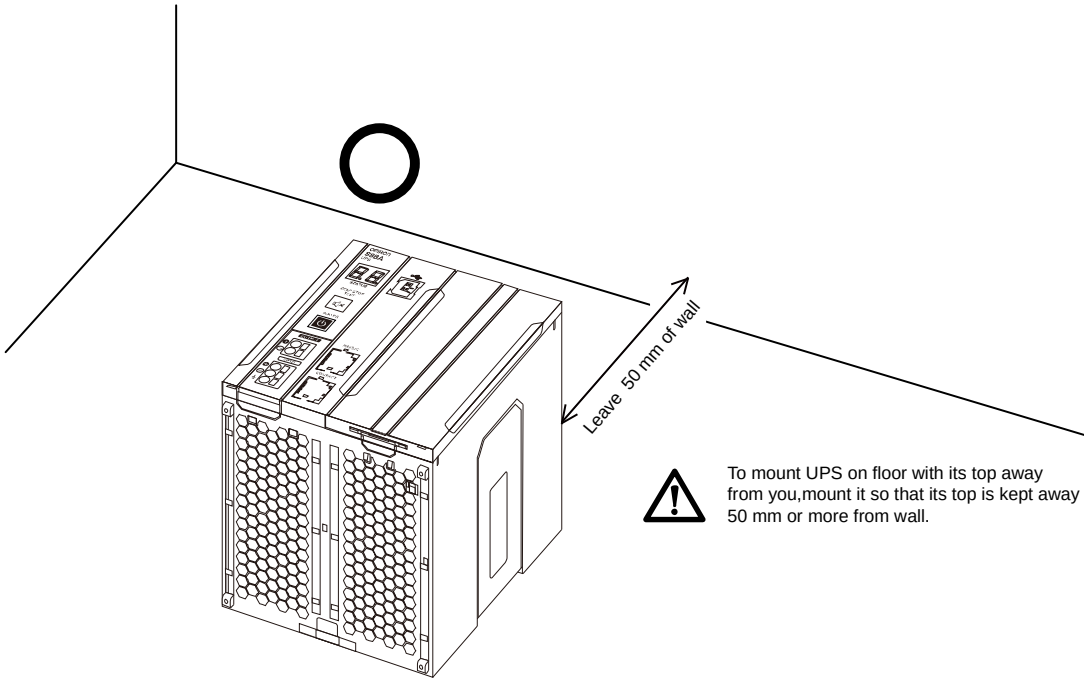
When you install devices other than the UPS on the left or the right of theUPS, leave the space specified by each device.

● Stationary mounting



To mount UPS on floor with its back away from you,mount it so that its back is in contact with wall.
(Because PCB is partially exposed in its back side, and UPS may be affected by static electricity for that reason.)

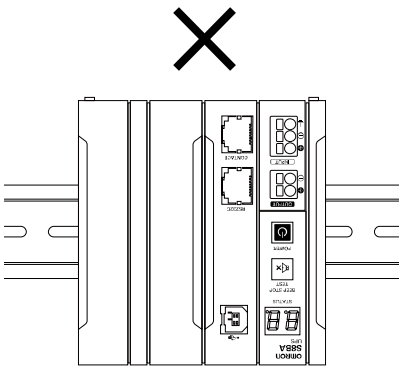
● Face-up mounting



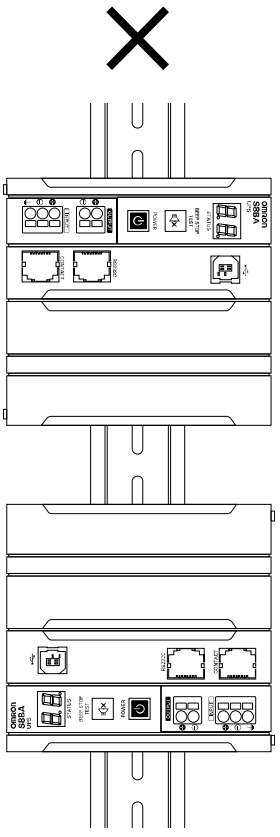
To mount UPS on floor with its top away from you,mount it so that its top is kept away 50 mm or more from wall.

■ Incorrect positions

● Mounting to the DIN rail

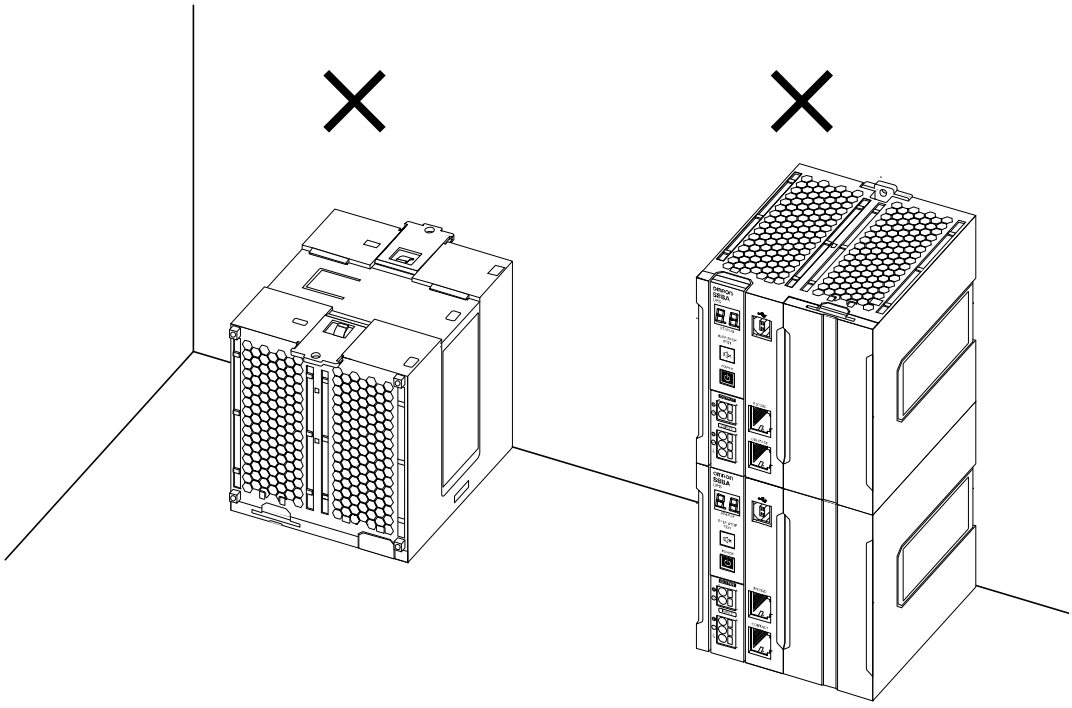


Mount UPS upside down



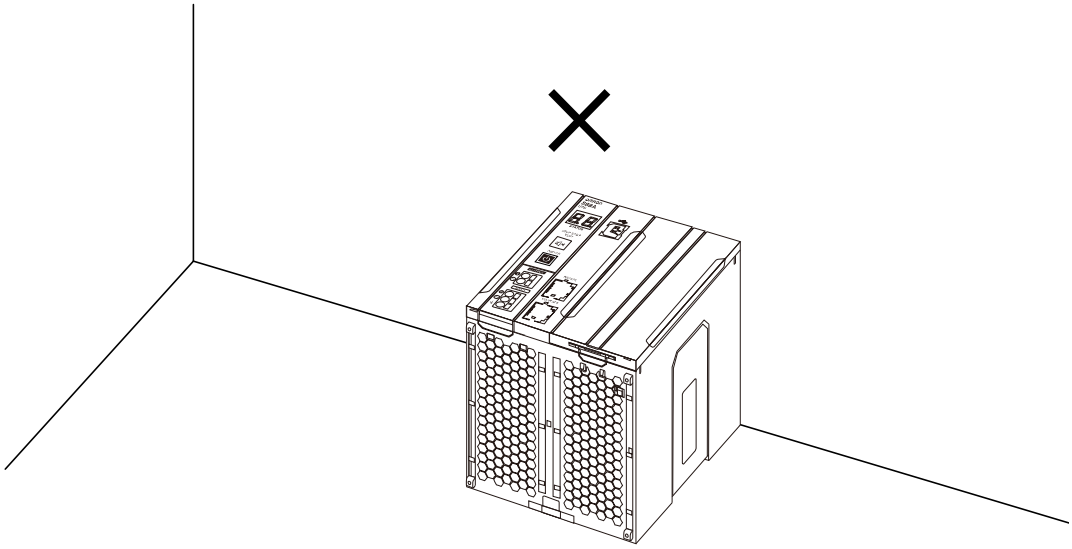
DIN rail is placed vertically

● Stationary installation



Do not mount on floorwith front down.

Do not stack.

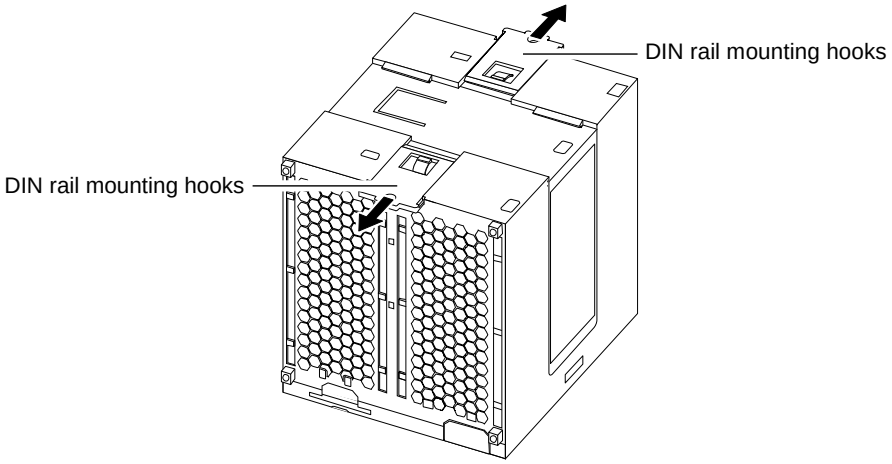


To mount UPS on floor with its top away from you, ensure that its top is not in contact with wall.

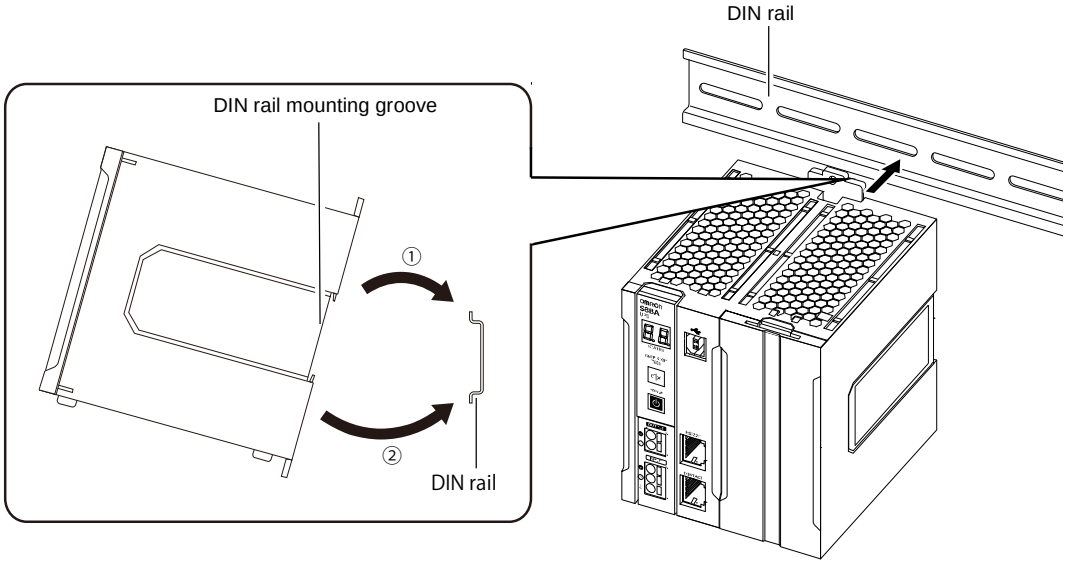
3-1-1 DIN rail installation

■ How to mount to the DIN rail

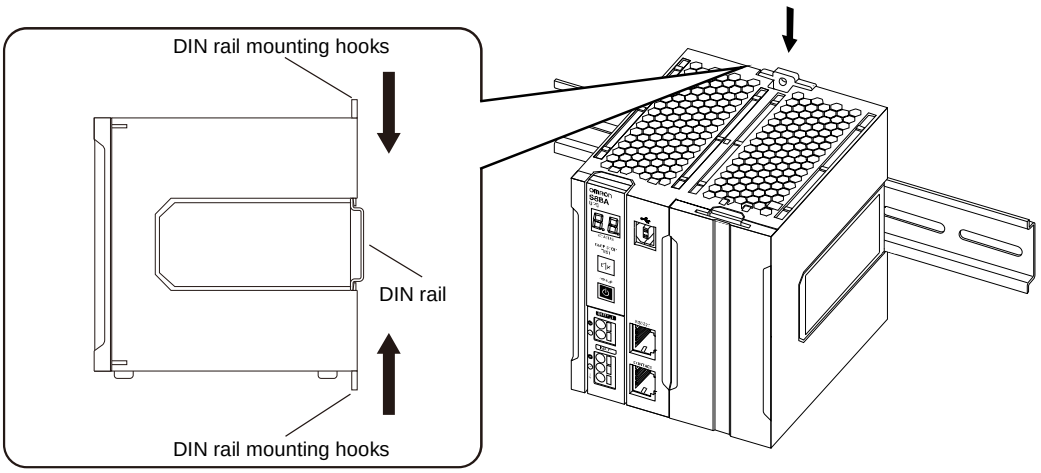
1. Open the “DIN rail mounting hooks” in the back of the UPS.



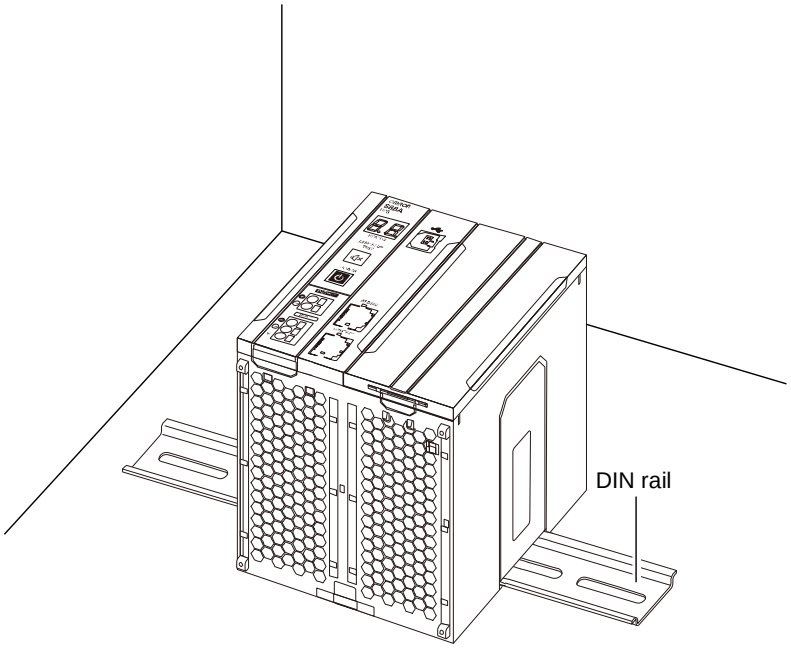
2. Hook the “DIN rail mounting groove” in the back of the UPS onto the DIN rail. Put a hook on the groove on one end (①), and put the other hook on the groove on the other end (②).



3. Close the “DIN rail mounting hooks” in the back of the UPS.

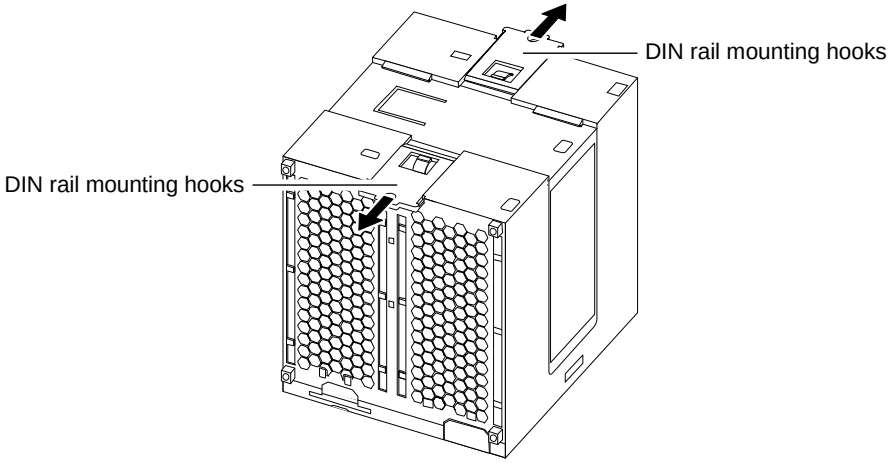


● Mounting on the floor

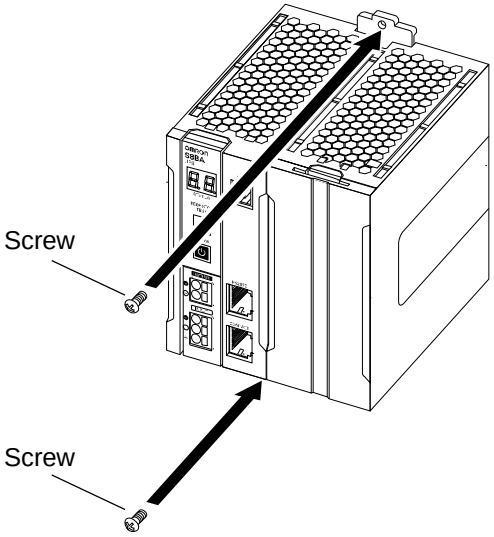


3-1-2 Wall or floor mounting procedure

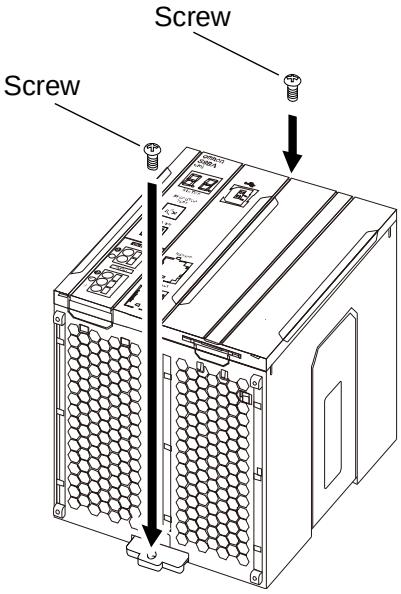
1. Open the “DIN rail mounting hooks” in the back of the UPS.



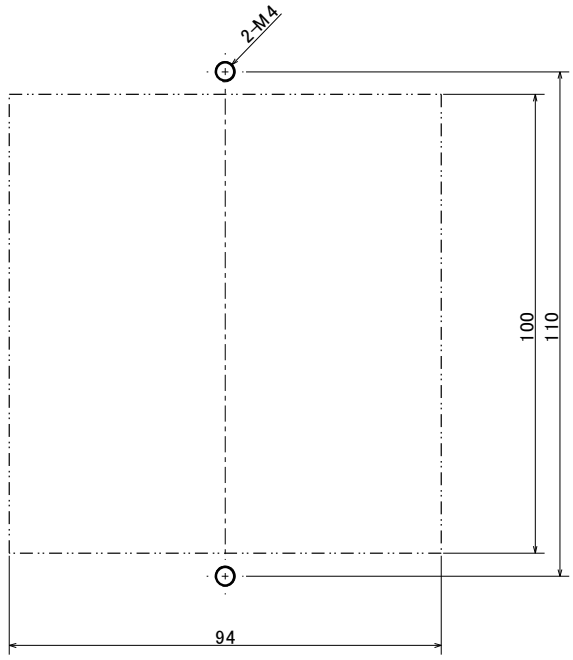
2. Use the screw holes of the “DIN rail mounting hooks” to fix the UPS to the floor or wall with screws.



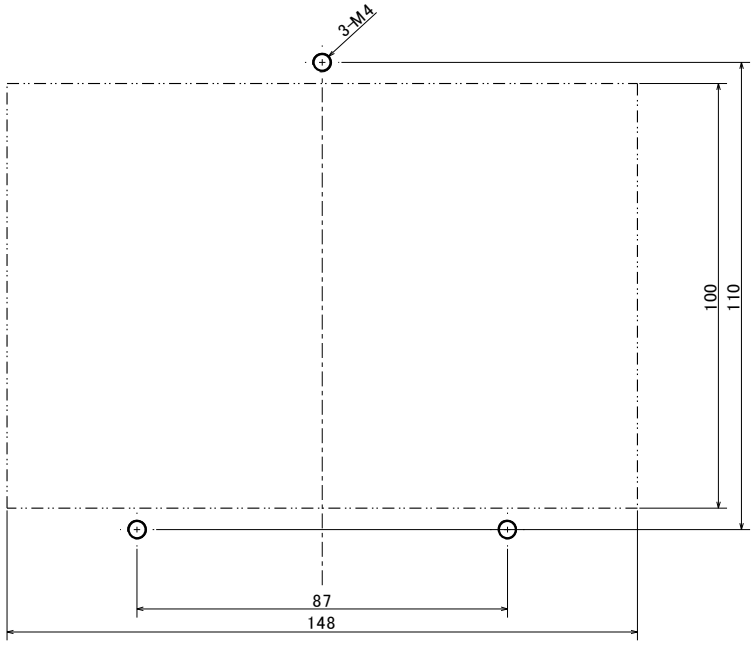
● Mounting on the floor



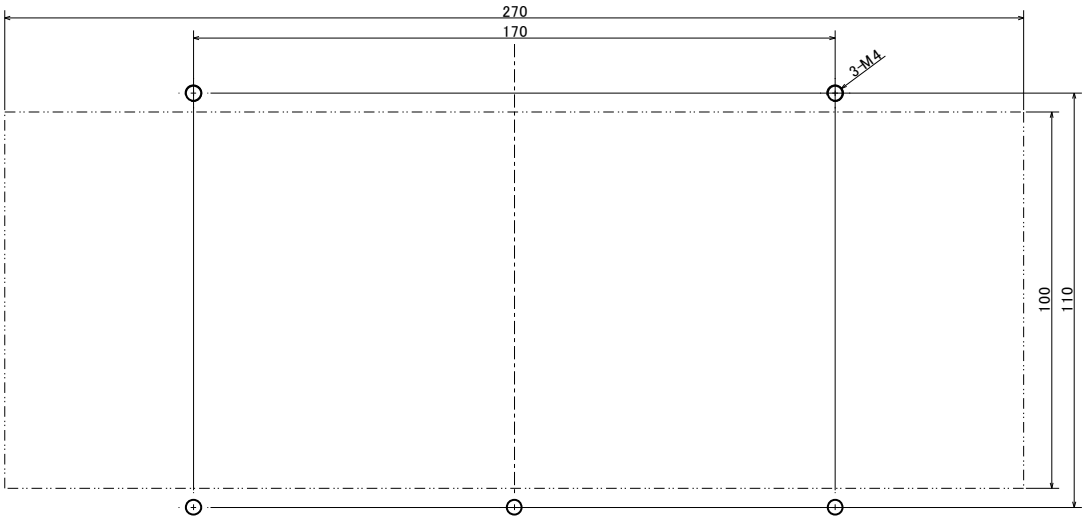
● 120W Fix with screws



● 240W Fix with screws



● 480W Fix with screws



3-2 Connection

This section describes how to connect the UPS.

For cautions when connecting the UPS, refer to “Caution (for installation and connection)” shown in the “Safety precautions” of the beginning of this manual.

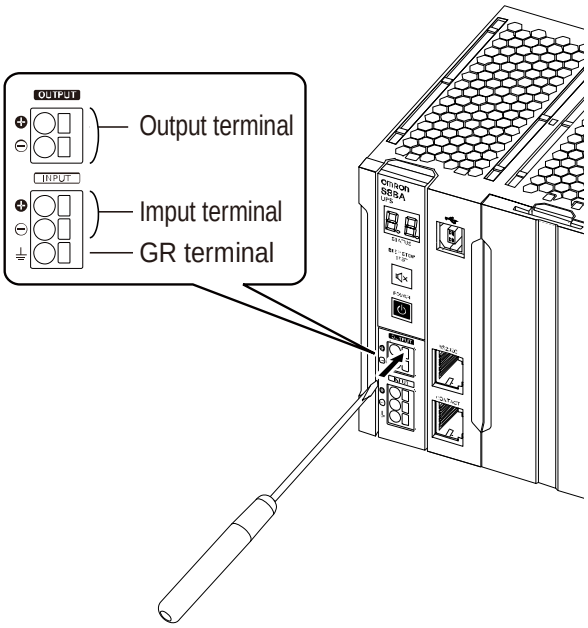
3-2-1 Connecting a cable to the input terminal block and the output terminal block

For details about the connectable sizes and recommended cable sizes, see the following table.

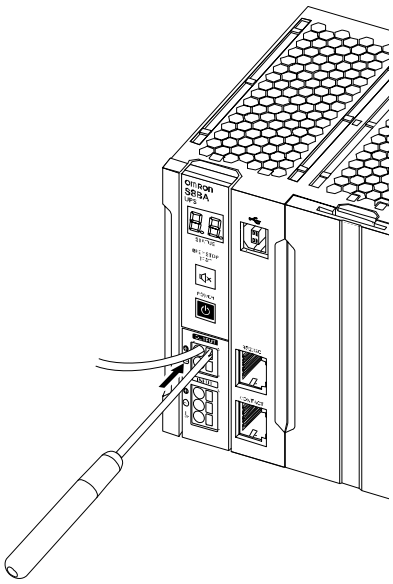
<table>
<tr><td rowspan="3">Connectable sizes</td><td rowspan="3">Cable</td><td>Solid wire</td><td>0.2～4.0mm^2</td></tr>
<tr><td>Stranded wire</td><td>0.2～2.5mm^2</td></tr>
<tr><td>AWG</td><td>AWG24～12</td></tr>
<tr><td colspan="3">Stripped cable length</td><td>8～10mm</td></tr>
<tr><td rowspan="8">Recommended sizes</td><td rowspan="2">5A</td><td>Solid wire / Stranded wire</td><td>0.5mm^2</td></tr>
<tr><td>AWG</td><td>AWG20</td></tr>
<tr><td rowspan="2">10A</td><td>Solid wire / Stranded wire</td><td>0.75mm^2</td></tr>
<tr><td>AWG</td><td>AWG16</td></tr>
<tr><td rowspan="2">15A</td><td>Solid wire / Stranded wire</td><td>1.25mm^2</td></tr>
<tr><td>AWG</td><td>AWG14</td></tr>
<tr><td rowspan="2">20A</td><td>Solid wire / Stranded wire</td><td>2.0mm^2</td></tr>
<tr><td>AWG</td><td>AWG12</td></tr>
<tr><td colspan="3">Temperature rating for recommended cable</td><td>90℃</td></tr>
</table>

■ Connecting a cable to the terminal block

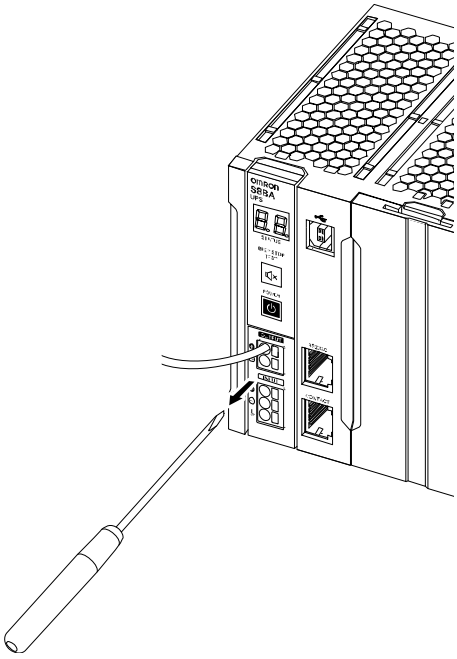
1. Insert the tip of a flat blade screwdriver with a 3 mm or less thin blade into a square hole at the right of the terminal block. Then, the cable lock is released.



2. With the tip of the flat blade screwdriver in the hole, insert a cable into a round hole at the left of the terminal block.

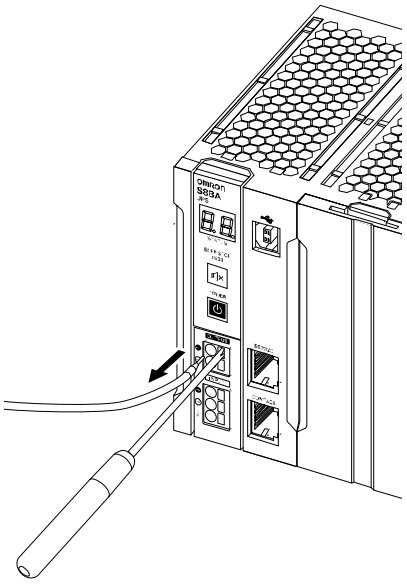


3. Pull out the flat blade screwdriver. Then, the cable is locked.

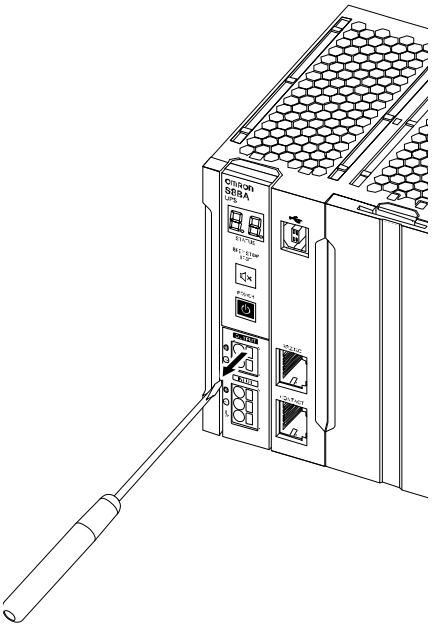


■ Removing a connected cable from the terminal block

1. Insert the tip of a flat blade screwdriver with a 3 mm or less thin blade into a square hole at the right of the terminal block and pull out the cable.

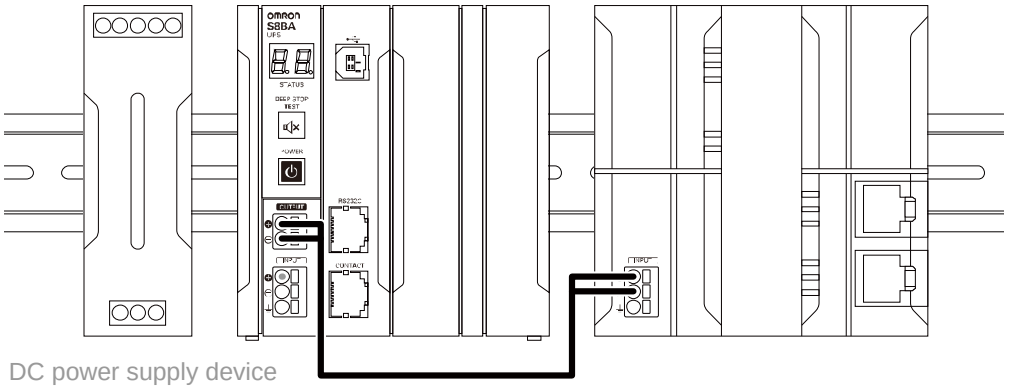


2. Pull out the flat blade screwdriver.



3-2-2 Connecting a device to the output terminal block

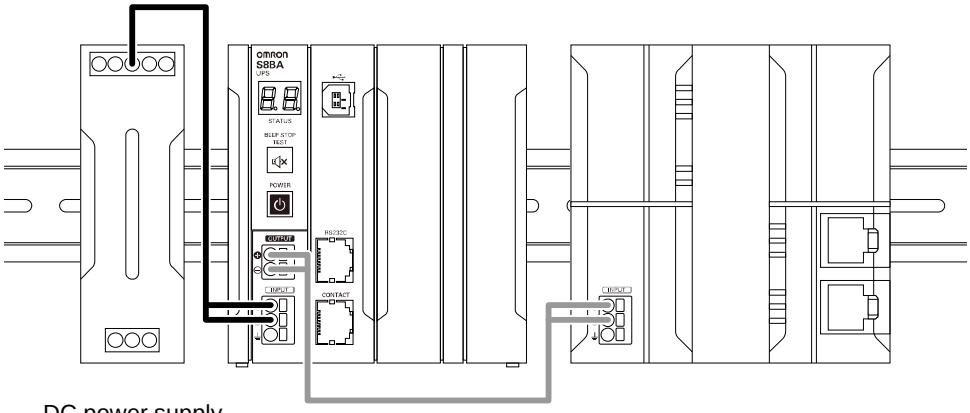
1. Connect devices you want to back up to output terminals of this unit.



2. When using the UPS monitoring software or the I/O signal, connect the unit to the target device with a connection cable. For details about the connection procedure, see “5 Maintenance and inspection”, and “6 To perform shutdown processing of the devices when a power failure occurs”.

3-2-3 Connecting the input power supply to the input terminal block

1. Connect an input cable to the input terminal block of the unit.



2. Connect the input cable to the DC power supply device.
Turn the input power supply ON and turn the “Power” switch ON, and power output operation starts, and at the same time, battery charging operations starts; the battery will be completely charged in about 4 hours.

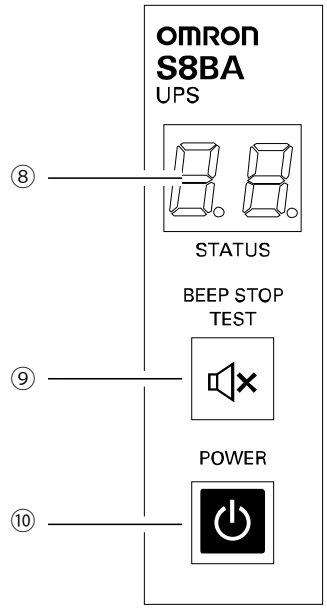
Notes

Note that the battery in this unit has not been charged prior to shipment. Charge the battery when you use the UPS for the first time.

4 Check and start operation

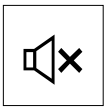
4-1 The name and function for the operation and display

4-1-1 Name of each part



⑧“Status indicator” digital indicator (Green)
⑨“Beep Stop/Test” switch (Black)
⑩“Power” switch (Gray)

4-1-2 Switch

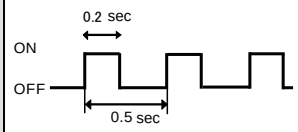
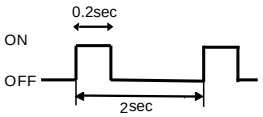
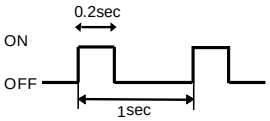
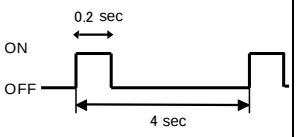
Sign of the figure	Label	Name	Description
⑨	BEEP STOP TEST 	“Beep Stop/Test” switch	・Stop the beeper: Hold down for 0.5 seconds or longer. ・Perform the self-diagnostic test: Hold down for 5 seconds or longer (enabled only when the power is turned ON). ・Shift to battery replacement mode: Hold down for 10 seconds or longer.
⑩	POWER	“Power” switch	・Turn the power ON: Hold down for 3 seconds or longer when the power is turned OFF, and the power output starts. ・Turn the power OFF: Hold down for 3 seconds or longer when the power is turned ON, and the power output stops. Additional Information: When input power is being supplied to the unit and the power is turned ON, battery

			charging operation starts.

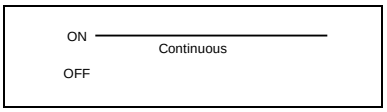
4-1-3 Beep sound

■ Type of beep sound

● Intermittent

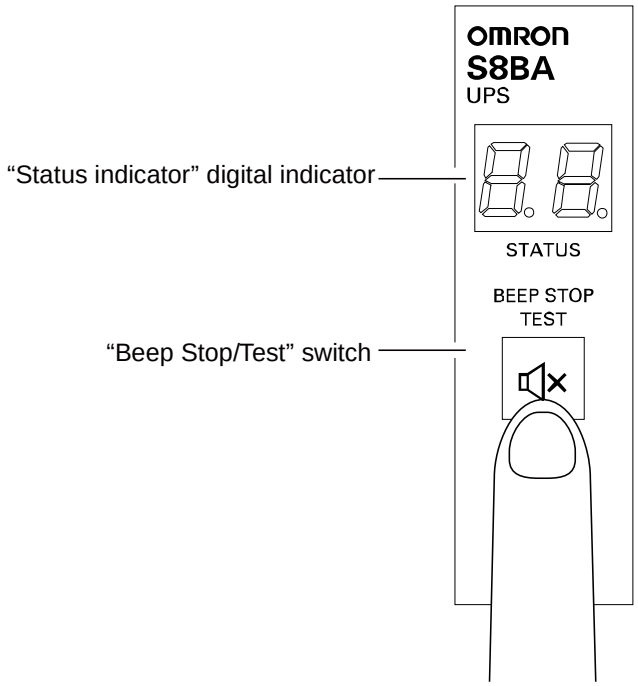
0.5-second intervals:		2-second intervals:	
1-second intervals:		4-second intervals:	

● Continuous



■ Stopping the beep sound

When the beep is sounding, you can stop it by pressing and holding the “Beep Stop/Test” switch for 0.5 seconds or longer. You cannot cancel the pause. Be careful.



4-2 Start and stop procedures and basic operation

4-2-1 Start and stop procedures

For cautions when operating the UPS, including start and stop, refer to “Caution (for use)” shown in the “Safety precautions” of the beginning of this manual.

■ Start procedure

Hold down the “Power” switch of the unit for 3 seconds or longer.

- A few seconds after the switch is turned ON, the power output from the input power supply starts as-is (Status indicator “On”).
- The status indicator displays “FU” , and the self-diagnostic test is performed in Battery Mode for about 10 seconds. If the battery level is low, the self-diagnostic test is not performed. It is automatically executed after the battery is charged.
- When the self-diagnosis test finishes normally, the unit enters the normal operating state.
- When the self-diagnostic test is not performed, the unit enters immediately the normal operation.

Status indicator	
Power supply output terminal	Outputs power (connected devices are powered)

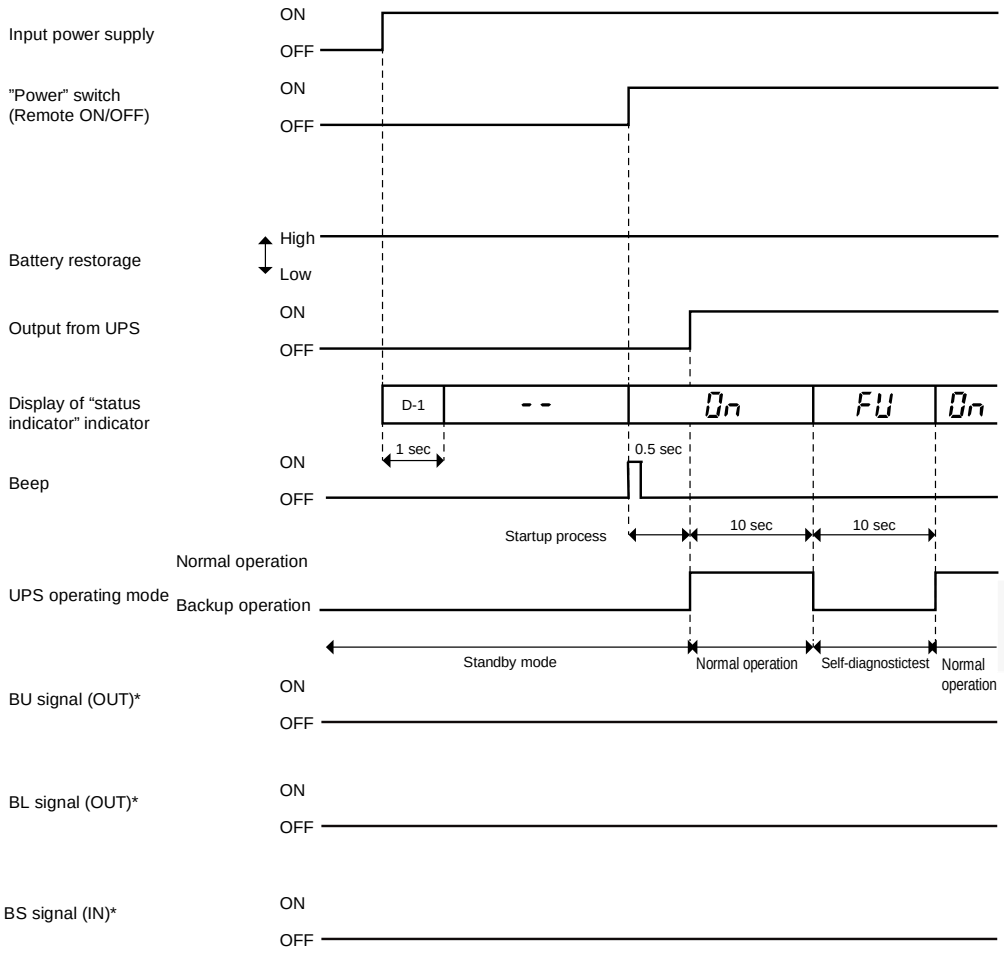
- During operation, the battery is charged automatically.

■ Startup sequence

This section describes the startup sequence.

● To start the UPS when in standby mode by turning on the Power switch.

This unit starts up immediately when the “Power” switch is turned ON.

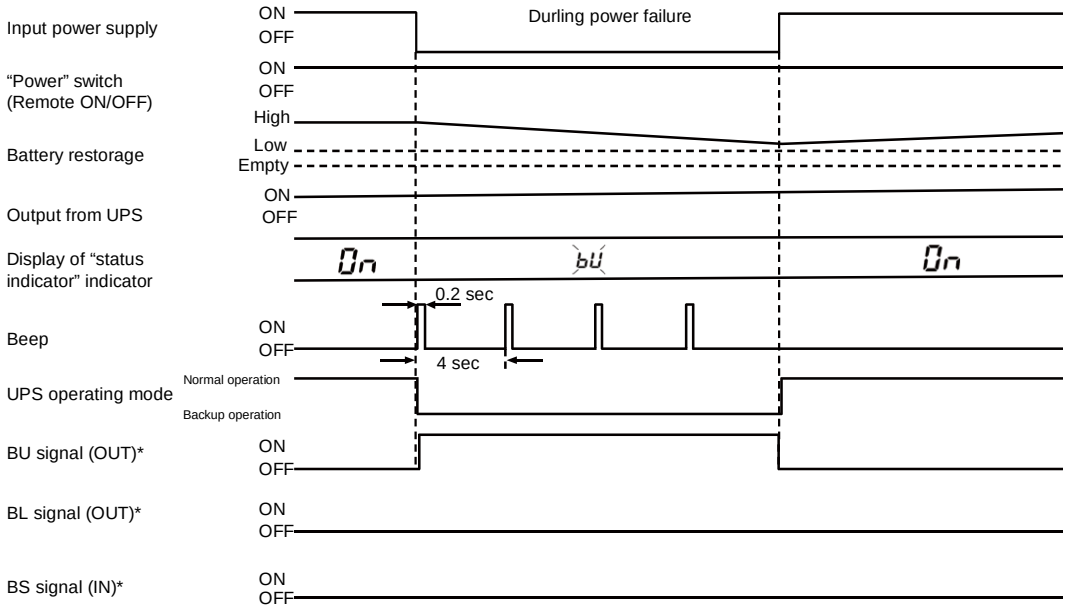


＜Note＞
D-1: Display the latest UPS fault mode (E0, ES, E1 or --)
(If there is no record for UPS error, UPS display the "--")
*For details, see 7-1 I/O signal functions.

■ The backup sequence when power failure/voltage drop (instantaneous voltage drop) occures

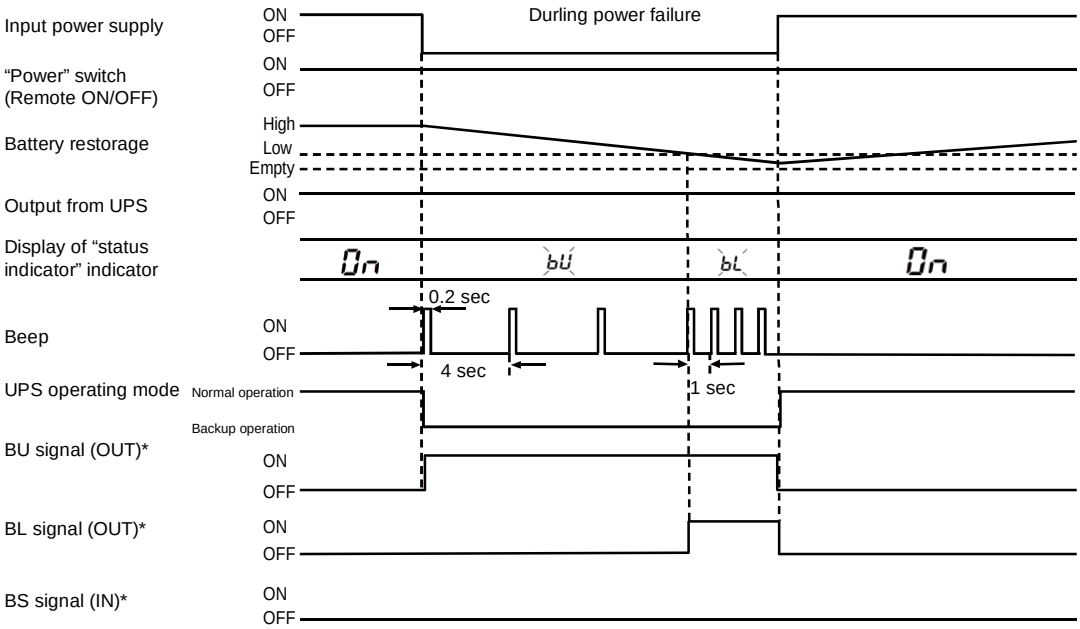
Explains the backup sequence when a power failure occurs.

● When the input power supply recovers while the battery level is sufficiently high



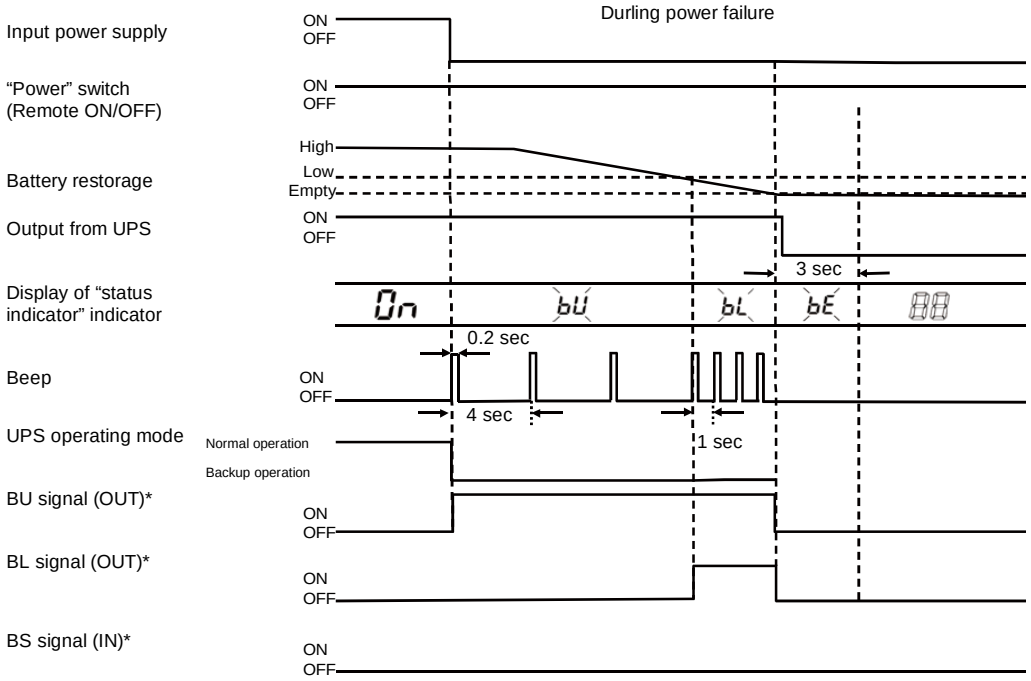
*For details, see 7-1 I/O signal functions.

● When the input power supply recovers while the battery level is Low



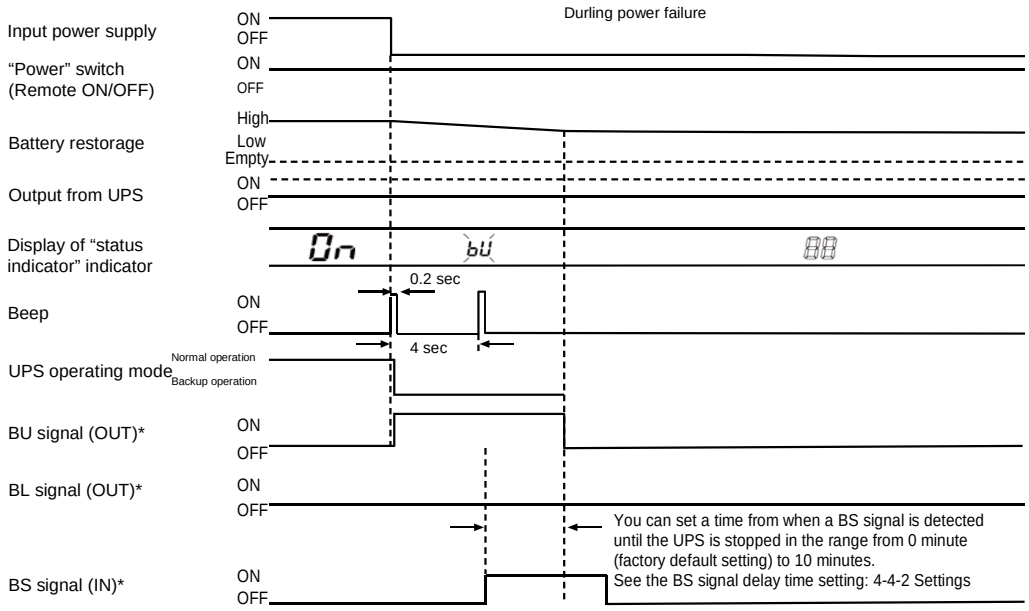
*For details, see 7-1 I/O signal functions.

● When the input power supply does not recover until the battery becomes empty



*For details, see 7-1 I/O signal functions.

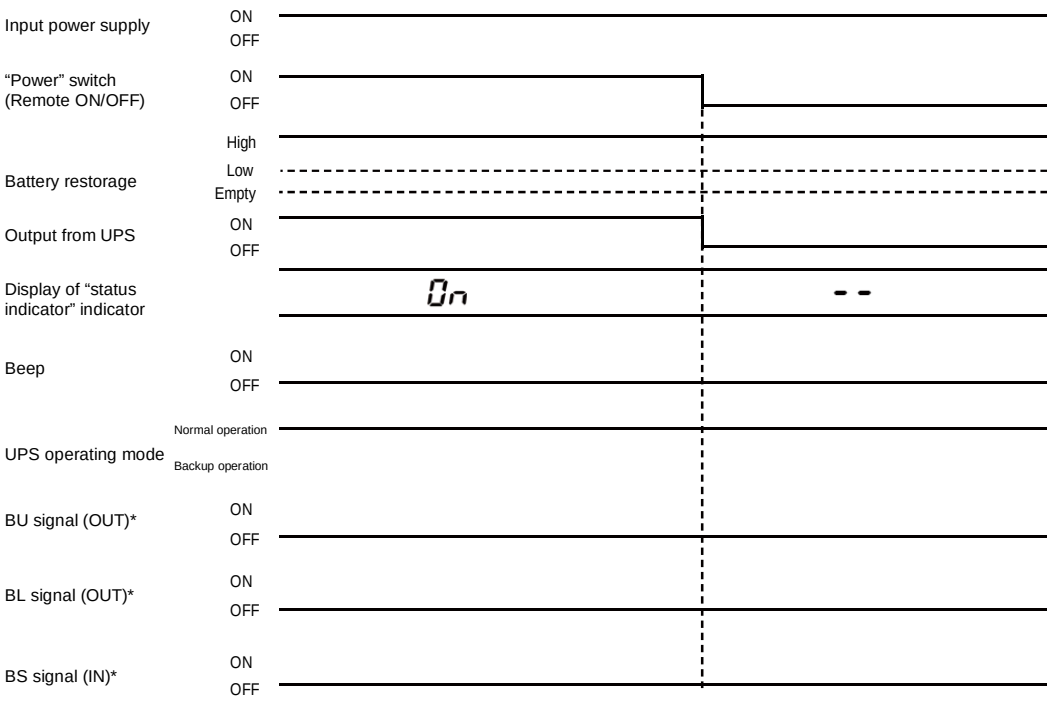
- For shutdown by a BS signal



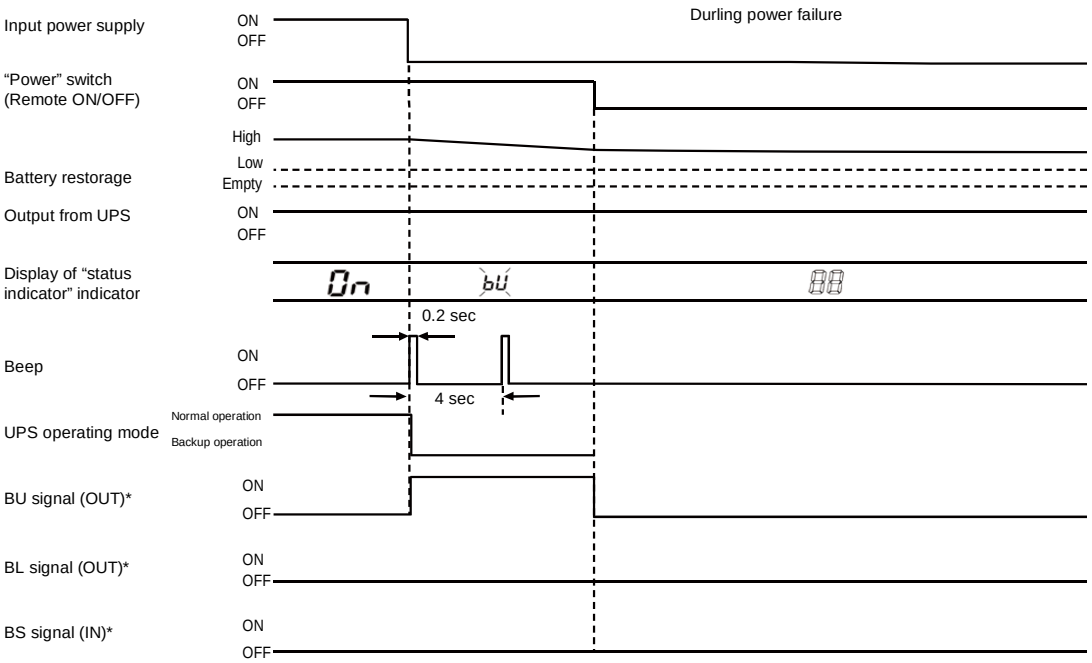
*For details, see 7-1 I/O signal functions.

■ Operation sequence when the "Power" switch is turned OFF

● When the "Power" switch is turned OFF during normal operation

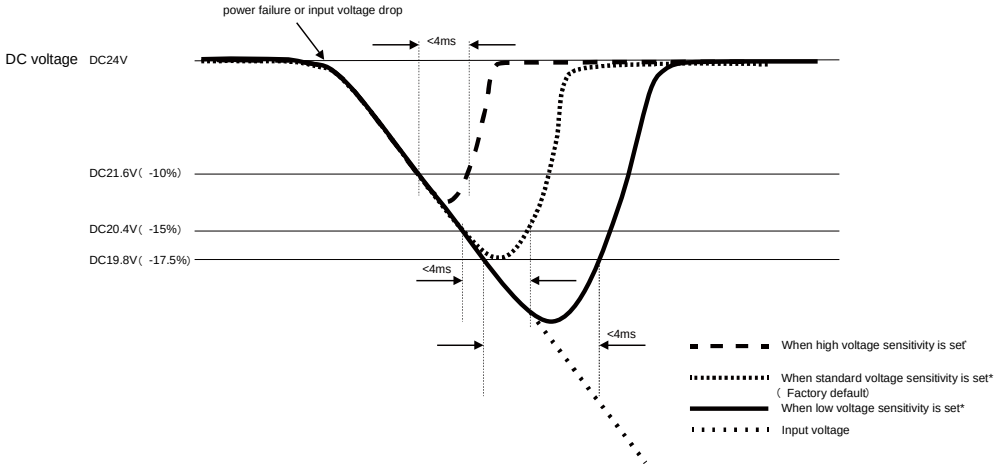


- When the "Power" switch is turned OFF during backup operation



■ Input and output voltage time chart when shifting to backup operation

Explains the operation when shifting to backup operation due to power failure or input voltage drop.



*For details, see “4-4 UPS operation mode settings”, “Input sensitivity setting”

<Measurement condition>

Switching power supply：S8VK-G48024

UPS：S8BA-24D24D240LF

Load：Rated load

When power failure occurs on the AC input side of the switching power supply

■ Operation after a power failure

If a power failure or input power supply error occurs, the operation automatically switches to backup operation to continue the power output by using electrical power from the battery.

(: indicates blinking)

Status indicator	Output	Description
	ON	Backup operation is in progress due to power failure or input power supply error.
	ON	Backup is operating due to power failure or AC input error. Battery level is low, so output will stop soon.
	OFF	Battery is dead, so output stopped.

■ Operation when power is restored

● When power is restored during backup operation

When power is restored during backup operation, the output from input power supply automatically starts again and the output operation continues. In addition, the battery charging operation starts.

● When power is restored after the power supply output stops

If the power supply output stops due to empty battery, the unit automatically restarts and resumes the power supply output when power is restored. And the battery charging operation starts.

Reference

Using operation mode settings, you can set whether to automatically restart when power is restored ("restart" is set by factory default).

■ Operation when stopping

Hold down the “Power” switch of the unit for 3 seconds or longer, and the power is turned OFF and the output stops.

Reference

When the “Power” switch is turned OFF, the battery charging operation stops.

4-3 Interpreting beeps and displays

○ indicates the display is OFF
● indicates the display is ON
◌ indicates blinking

No.	Status indicator	UPS output	Beep	Charge/ Discharge	“Power” switch	Input power supply	Description	Procedures
1	00	OFF	OFF	---	OFF	OFF	No DC input Paused	---
2	- -	OFF	OFF	---	OFF	ON	DC input "Power" switch "OFF"	---
3	H-	OFF	OFF	---	OFF	NG	Error: DC input voltage higher than the specified range	Use in the DC input voltage range described in the specification.
4	L-	OFF	OFF	---	OFF	NG	Error: DC input voltage lower than the specified range	Use in the DC input voltage range described in the specification.
5	HS	OFF	OFF	Charge	ON	ON	Waiting to start up due to low battery.	Continue charging the battery. When the set battery level is reached, the UPS automatically restarts. The setting can be changed by the operation mode. (See 4-4 UPS operation mode settings)
6	On	ON	OFF	Charge	ON	ON	"Power" switch "ON" Normal operation * Dot at bottom right lit during charging operation	---
7	FU	ON	OFF	Discharge	ON	ON	Self-diagnosis test in progress	---

○ indicates the display is OFF
● indicates the display is ON
◌ indicates blinking

No.	Status indicator	UPS output	Beep	Charge/ Discharge	"Power" switch	Input power supply	Description	Procedures
8		ON	Intermittent, at 2s intervals	Charge	ON	ON	Battery deterioration detected by self-diagnosis test. (Displayed during normal operation only)	Replace the battery. Get an optional replacement battery, and you can replace the battery on your own (see 5-2 Replacing the battery).
9		ON	Intermittent, at 2s intervals	Charge	ON	ON	Battery life counter counted up to limit (Displayed during normal operation only)	
10		ON	---	---	ON／OFF	ON	Battery replacement mode activated.	Replace the battery. (See 5-2 Replacing the battery).
11		ON	Intermittent, at 4s intervals	Discharge	ON	OFF/ NG	Backup operation due to power failure or DC input error. Output stops if backup operation is continued.	Process the termination of the connected devices you are using, and then stop the devices.
12		ON	Intermittent, at 1s intervals	Discharge	ON	OFF/ NG	(Same as above) Output stops soon Battery level low.	
13		ON	OFF	---	ON	OFF/ NG	Output stopped due to low battery (displayed for a few seconds only).	Charge the battery.
14		ON	OFF	---	ON	ON	Ambient temperature 55℃ or higher or 0℃ or lower detected, and battery charging operation stopped. (Displayed during normal operation only)	Set the ambient temperature within the range from 0℃ to 55℃.
15		ON	OFF	Charge	ON	ON	UPS main body's life counter counted up to limit (displayed during normal operation only).	Replace the UPS.

16		ON	Intermittent, at 0.5s intervals	Charge/ Discharge	ON	ON/ OFF	Overcurrent (110% or higher) detected because connections exceeded capacity limit.	Reduce connected devices until the display condition becomes as shown in No.6.

○ indicates the display is OFF
● indicates the display is ON
indicates blinking

No.	Status indicator	UPS output	Beep	Charge/ Discharge	"Power" switch	Input power supply	Description	Procedures
17		OFF	Continuous	Discharge	ON	OFF	Overcurrent (115% or higher) and output voltage drop detected because connections exceeded capacity limit.	Turn OFF all the "Power" switches on the UPS and connected devices, reduce the connected devices, and turn ON the "Power" switches on the UPS and remaining connected devices.
18		OFF	Continuous	---	ON	ON	Stopped due to short-circuit on connected device side or due to connections exceeding capacity limit significantly.	Check that the DC input of any of the connected devices is not short-circuited and that connections did not exceed the rated capacity.
19		ON	Continuous	---	ON	ON/ OFF	Output voltage error (Up).	Turn OFF all the "Power" switches on the UPS and connected devices, and turn ON the "Power" switch on the UPS only again.
20		ON	Continuous	---	ON	ON/ OFF	Output voltage error (Down).	
21		ON	Continuous	Charging stopped	ON	ON	Charging stopped due to battery charging voltage error (Up).	
22		ON	Continuous	Charging stopped	ON	ON	Charging stopped due to battery charging voltage error (Down).	
23		ON	Continuous	---	ON	ON/ OFF	Internal temperature error (overheat).	
24		ON	Continuous	---	ON	ON/ OFF	Error detected by inverter circuit check of self diagnosis test.	
25		ON	Continuous	---	ON	ON	Charging current error (overcurrent).	

26	E9	ON	Continuous	---	ON	ON/ OFF	Unable to communicate with battery through SMbus.	

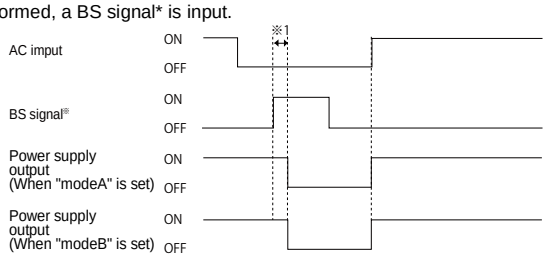
4-4 UPS operation mode settings

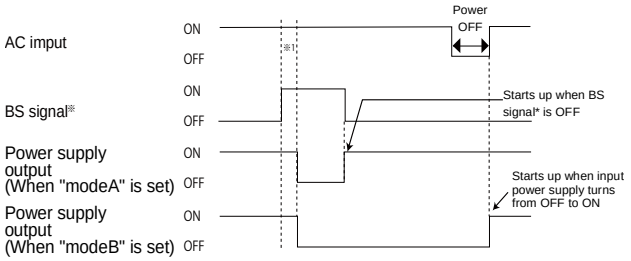
4-4-1 Settable items and explanations

You can set the UPS operation mode by operating switches on the operation panel.
The following table shows the settable items and their explanations.

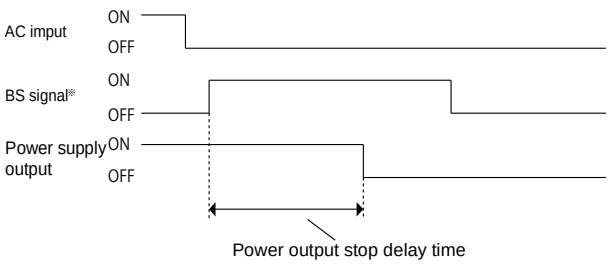
No	Item	Description
1	Beeper setting	Lets you set the beeper operation during backup operation or when an error occurs. ・Disable beeper: Do not generate beep sound. ・Enable beeper for error only: Generate beep sound when an error occurs. ・Enable beeper for all timings: Generate beep sound during backup operation and when an error occurs. “Disable beeper” is set by factory default.
2	Auto restart setting	Used to set the auto restart operation to be performed when power is restored after UPS shutdown. ・Enable auto restart: Automatically restart when power is restored. ・Disable auto restart: Do not automatically restart when power is restored. “Enable auto restart” is set by factory default.
3	Auto test setting	Lets you set the operation for automatically executing a self diagnosis test. ・Enable test for all timings: Automatically execute a test at UPS startup and once every 4 weeks. ・Enable test for startup only: Automatically execute a test at UPS startup. ・Enable test for once every 4 weeks only: Automatically execute a test once every 4 weeks. ・Disable test: Do not automatically execute a test. “Enable test for all timings” is set by factory default.

<table>
<tr><th>No</th><th>Item</th><th>Description</th></tr>
<tr><td>4</td><td>Auto restart mode setting</td><td>Used to set the operation mode to be activated when the UPS automatically restarts after its shutdown.
・Mode A: Restart immediately when detecting that the input power supply is turned ON after the UPS stops.
・Mode B: Restart when detecting that the input power supply turns from OFF to ON after the UPS stops.
“Mode A” is set by factory default.

【Description of operation】
(1) When the input power supply is turned OFF and backup operation is being performed, a BS signal* is input.
 

(2) When the input power supply is turned ON and normal operation is being performed, a BS signal* is input.
 
</td></tr>
<tr><td>5</td><td>Input sensitivity setting</td><td>Lets you set the voltage sensitivity by which the UPS can detect an input power supply error.
・Standard voltage sensitivity: Perform backup operation when the input voltage is not in the specified range ±10%.
・Low voltage sensitivity: Perform backup operation when the input voltage is not in the specified range ±12.5%.
・High voltage sensitivity: Perform backup operation when the input voltage is not in the specified range ±5%.
“Standard voltage sensitivity” is set by factory default.

<table>
<tr><th>Voltage sensitivity</th><th>Low sensitivity</th><th>Standard sensitivity</th><th>High sensitivity</th></tr>
<tr><td>Voltage for shifting to backup operation (high)</td><td>15%</td><td>12.50%</td><td>10%</td></tr>
<tr><td>Voltage for returning to commercial operation (high)</td><td>12.50%</td><td>10%</td><td>5%</td></tr>
<tr><td>Voltage for returning to commercial operation (low)</td><td>-12.50%</td><td>-10%</td><td>-5%</td></tr>
<tr><td>Voltage for shifting to backup operation (low)</td><td>-17.50%</td><td>-15%</td><td>-10%</td></tr>
</table></td></tr>
</table>

No	Item	Description
6	Logic of Remote ON/OFF signal setting	Lets you set the logic of remote ON/OFF signal. ・Stop when circuit is closed: Stop the UPS when the circuit between the terminals is closed. ・Stop when circuit is open: Stop the UPS when the circuit between the terminals is open. “Stop when circuit is closed” is set by factory default.
7	Cold start setting	Lets you set the cold start operation. The cold start refers to a function to start up the UPS in backup operation when the input power supply is turned OFF. ・Disable cold start: Can start the UPS only when the input power supply is turned ON. ・Enable cold start: Can start the UPS even when the input power supply is turned OFF. “Disable cold start” is set by factory default.
8	Battery life counter setting	Lets you set the battery life counter operation. The battery life counter refers to a function to send notification when battery replacement becomes necessary. ・Enable battery life counter: Enable the battery life counter. ・Disable battery life counter: Disable the battery life counter. “Enable battery life counter” is set by factory default.
9	Power switch function setting	Lets you set the operation to be performed when the power is turned OFF by pressing the “Power” switch. ・Immediately power OFF: Turn the power OFF immediately when the “Power” switch is pressed. ・Power OFF after PC shutdown: Send a false power failure signal to the PC when the “Power” switch is pressed. The shutdown operation is the same as when a power failure occurs. “Immediately power OFF” is set by factory default.
10	Maximum backup time setting	Lets you set the maximum backup time. In backup operation, when the specified period of time elapses, the output is stopped and the power is turned OFF. ・Setting range: No setting (∞) or 0.2 to 90 minutes “No setting (∞)” is set by factory default.
11	Startup battery level setting	Lets you set the lower limit for the battery level for automatic restart after UPS shutdown. Restart operation is not performed until the battery level becomes equal to or higher than the specified value. Used if you want to start the system after charging the battery. ・Setting range: 0 to 90% “0%” is set by factory default.
12	BS signal* delay time setting	Lets you set the delay time from when a BS signal* input is detected until the UPS is stopped. ・Setting range: 0 to 10 minutes “0 minute” is set by factory default. 
13	BU signal* delay time setting	Lets you set the delay time in the event of power failure from when backup operation starts until the BU signal* output is turned ON. ・Setting range: 0 to 90 seconds “0 second” is set by factory default.

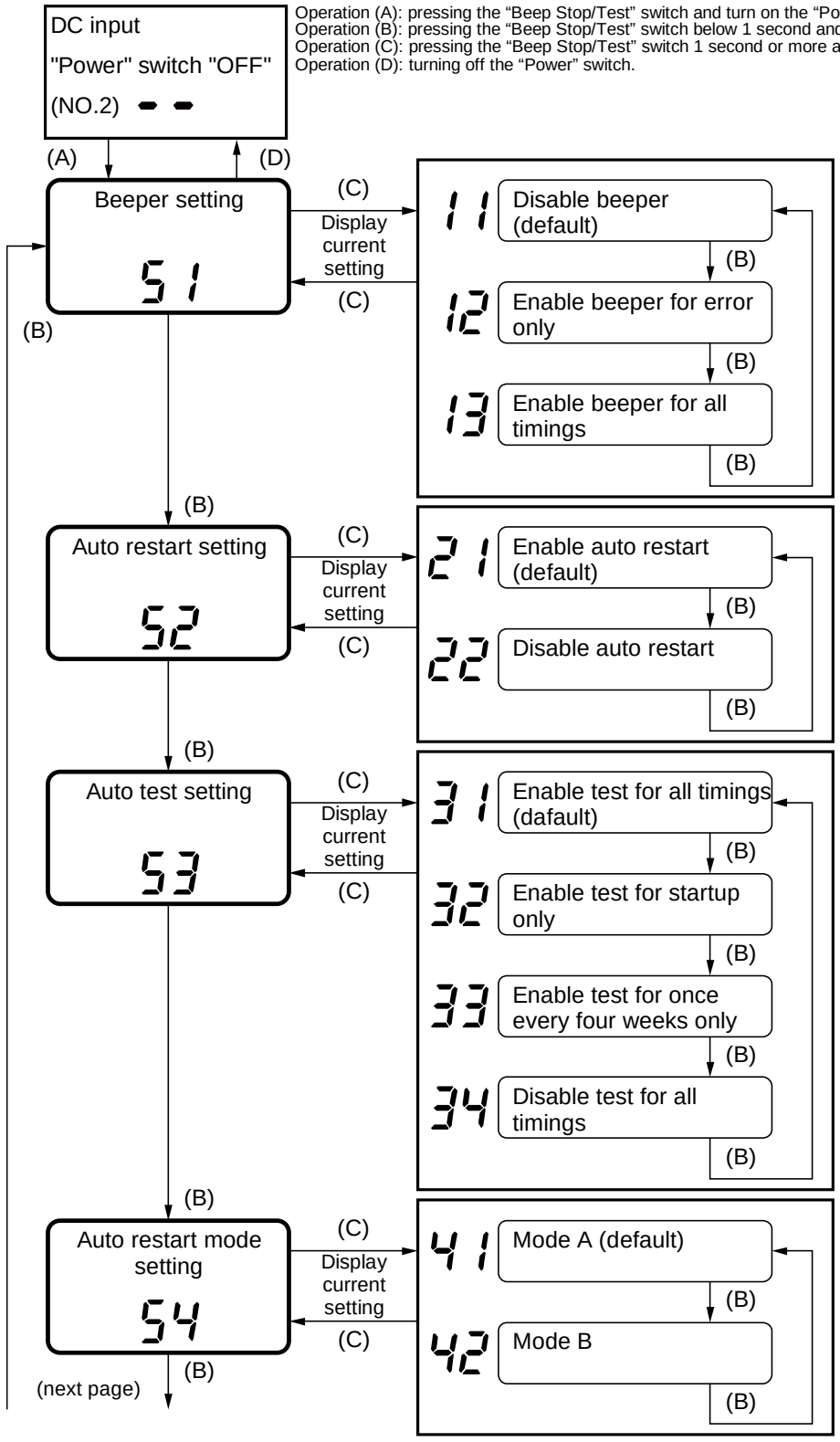
No	Item	Description
14	I/O signal test	Lets you test an I/O signal at the “CONTACT” port of the UPS. ・Four types of output signals can be forcibly turned ON. ・The ON/OFF status of two types of input signals can be checked using the status indicator and beep.

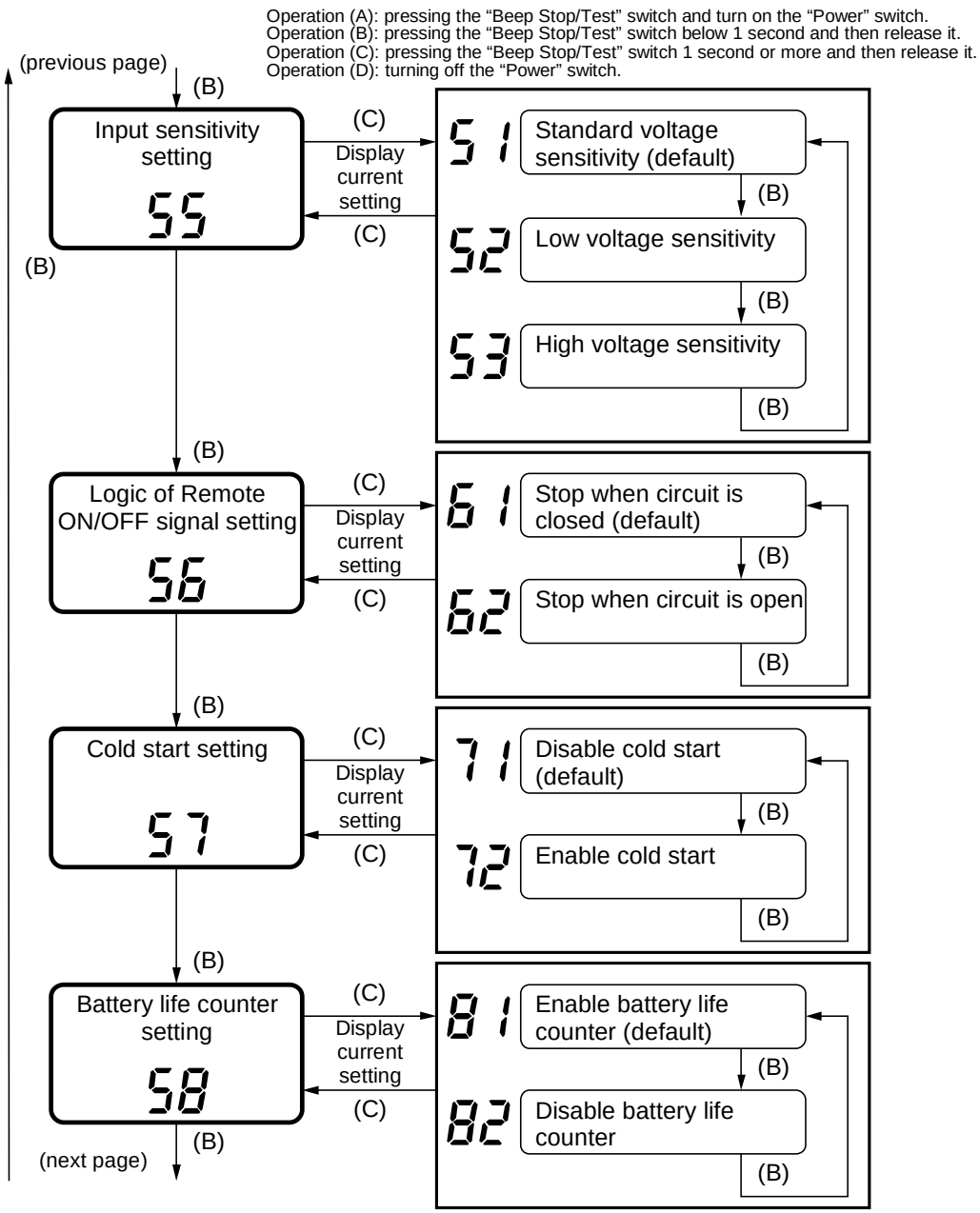
*For details, see 7-1 I/O signal functions.

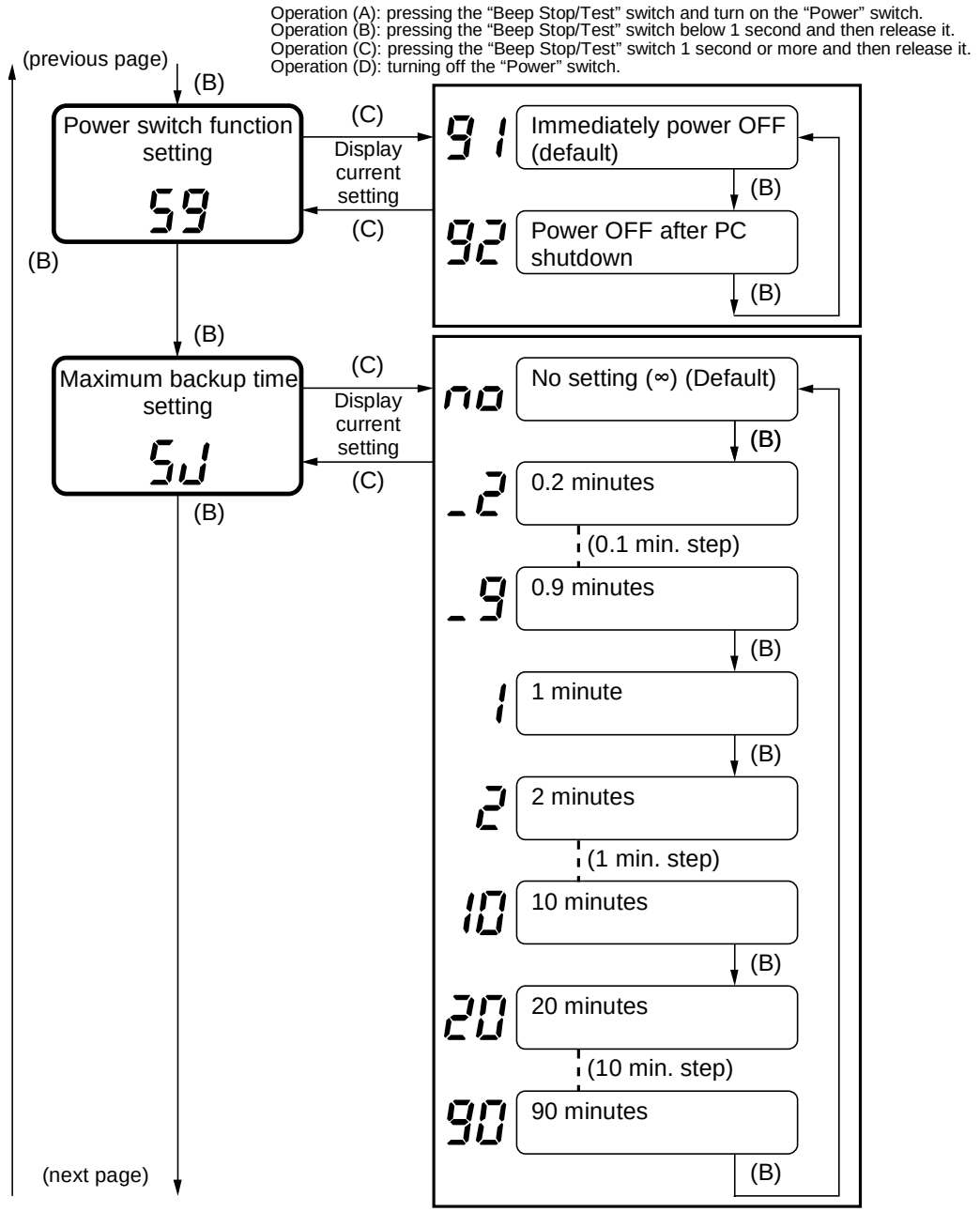
4-4-2 Settings

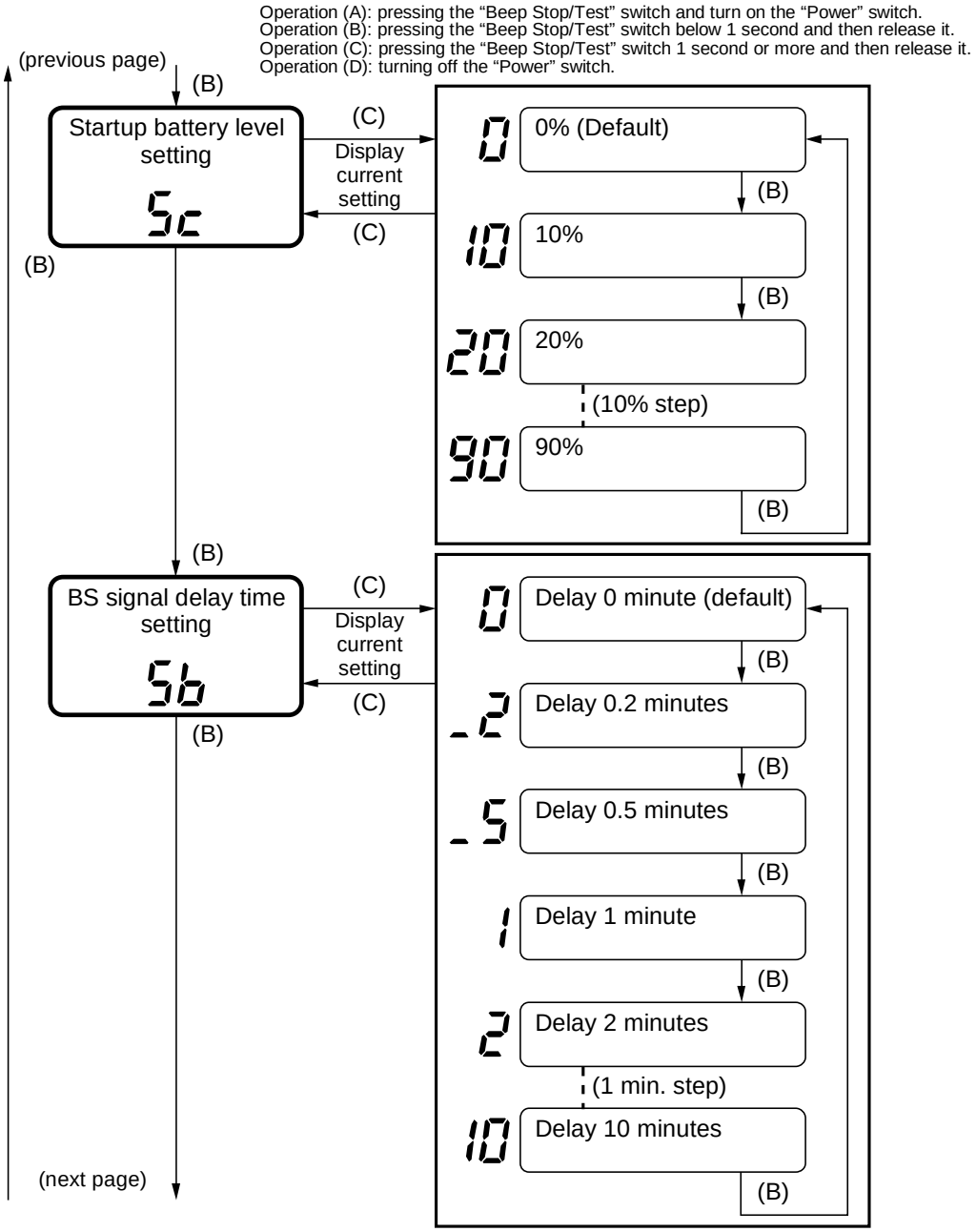
With the “Beep Stop/Test” switch held down, turn the “Power” switch to move to the UPS operation mode setting.

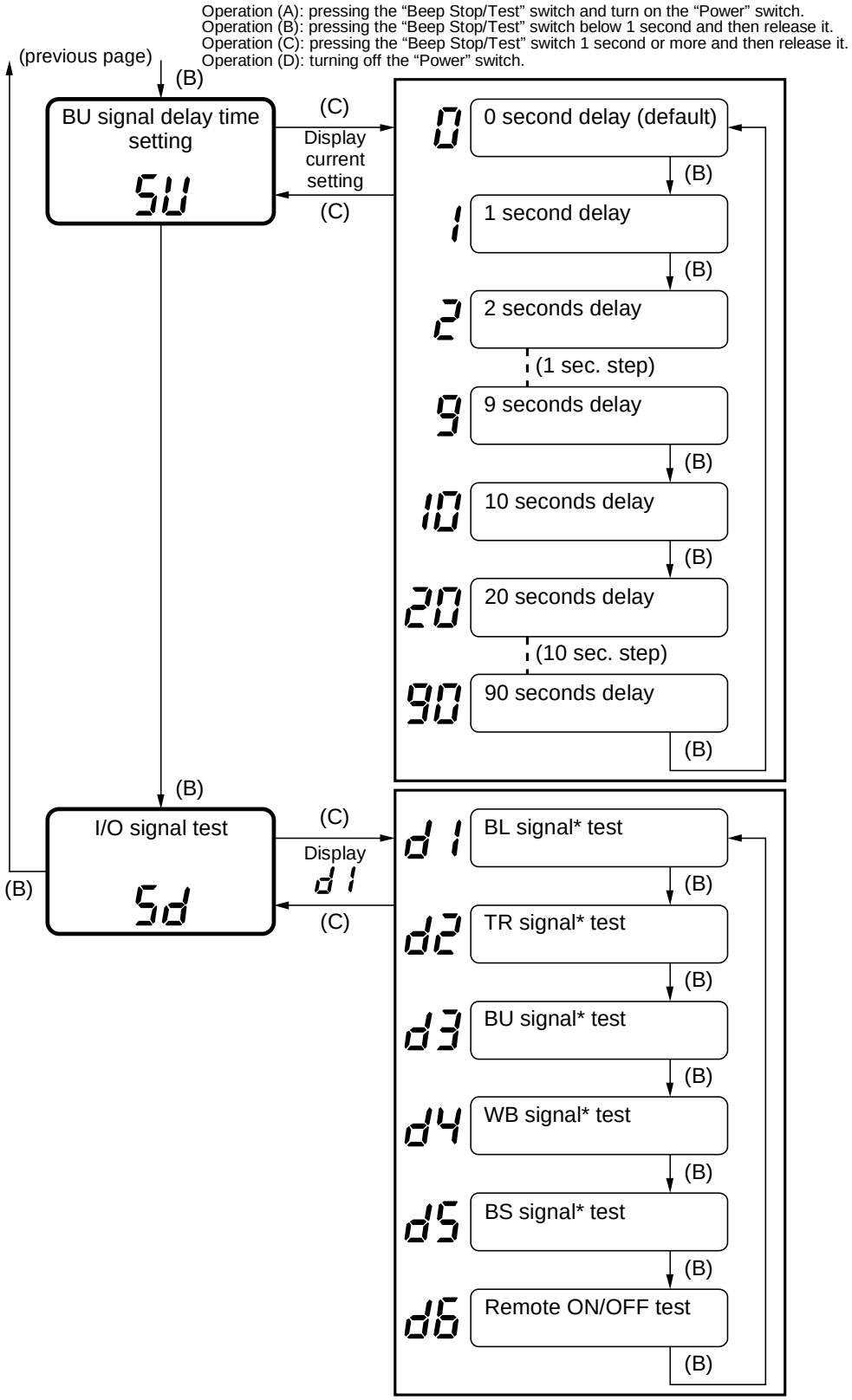
*While the setting mode is active, the output power supply is turned OFF.


DC input
"Power" switch "OFF"
(NO.2)
Operation (A): pressing the “Beep Stop/Test” switch and turn on the “Power” switch.
Operation (B): pressing the “Beep Stop/Test” switch below 1 second and then release it.
Operation (C): pressing the “Beep Stop/Test” switch 1 second or more and then release it.
Operation (D): turning off the “Power” switch.
(A)
(D)
Beeper setting
51
(C)
Display current setting
(C)
(B)
11
Disable beeper (default)
12
Enable beeper for error only
13
Enable beeper for all timings
(B)
Auto restart setting
52
21
Enable auto restart (default)
22
Disable auto restart
Auto test setting
53
31
Enable test for all timings (dafault)
32
Enable test for startup only
33
Enable test for once every four weeks only
34
Disable test for all timings
Auto restart mode setting
54
41
Mode A (default)
42
Mode B
(next page)


Operation (A): pressing the “Beep Stop/Test” switch and turn on the “Power” switch.
Operation (B): pressing the “Beep Stop/Test” switch below 1 second and then release it.
Operation (C): pressing the “Beep Stop/Test” switch 1 second or more and then release it.
Operation (D): turning off the “Power” switch.
(previous page)
(B)
Input sensitivity setting
55
(C)
Display current setting
(C)
(B)
51
Standard voltage sensitivity (default)
(B)
52
Low voltage sensitivity
(B)
53
High voltage sensitivity
(B)
(B)
Logic of Remote ON/OFF signal setting
56
(C)
Display current setting
(C)
(B)
61
Stop when circuit is closed (default)
(B)
62
Stop when circuit is open
(B)
(B)
Cold start setting
57
(C)
Display current setting
(C)
(B)
71
Disable cold start (default)
(B)
72
Enable cold start
(B)
(B)
Battery life counter setting
58
(C)
Display current setting
(C)
(B)
(next page)
81
Enable battery life counter (default)
(B)
82
Disable battery life counter
(B)

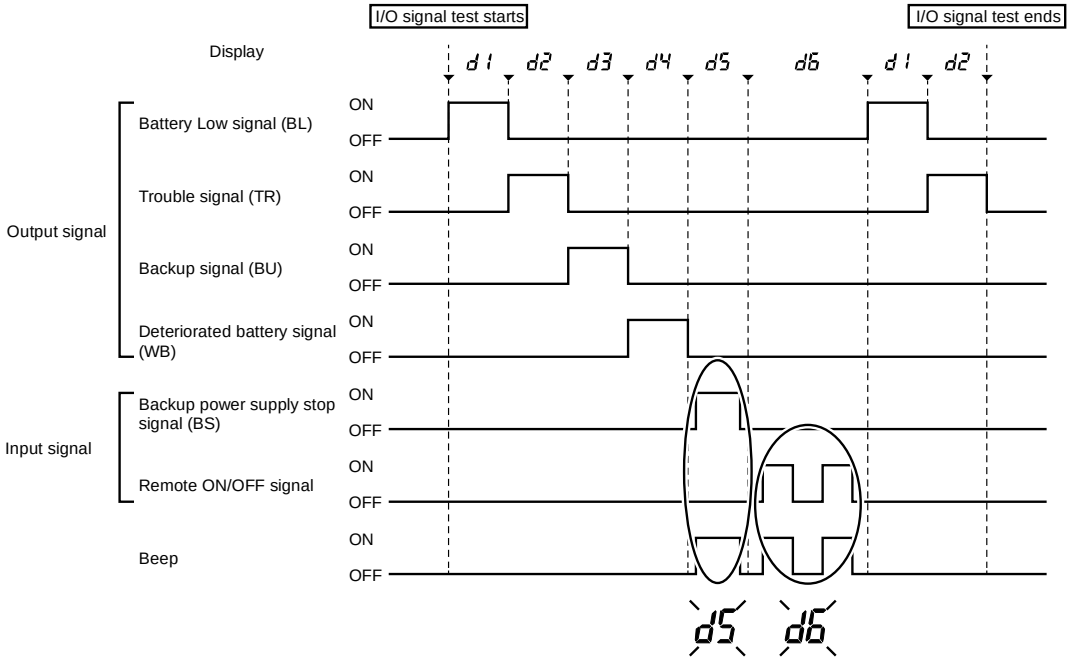

Operation (A): pressing the “Beep Stop/Test” switch and turn on the “Power” switch.
Operation (B): pressing the “Beep Stop/Test” switch below 1 second and then release it.
Operation (C): pressing the “Beep Stop/Test” switch 1 second or more and then release it.
Operation (D): turning off the “Power” switch.
(previous page)
(B)
Power switch function setting
59
(C)
Display current setting
(C)
(B)
91
Immediately power OFF (default)
(B)
92
Power OFF after PC shutdown
(B)
(B)
Maximum backup time setting
5J
(C)
Display current setting
(C)
(B)
no
No setting (∞) (Default)
(B)
_2
0.2 minutes
(0.1 min. step)
_9
0.9 minutes
(B)
1
1 minute
(B)
2
2 minutes
(1 min. step)
10
10 minutes
(B)
20
20 minutes
(10 min. step)
90
90 minutes
(B)
(next page)


Operation (A): pressing the “Beep Stop/Test” switch and turn on the “Power” switch.
Operation (B): pressing the “Beep Stop/Test” switch below 1 second and then release it.
Operation (C): pressing the “Beep Stop/Test” switch 1 second or more and then release it.
Operation (D): turning off the “Power” switch.
(previous page)
(B)
Startup battery level setting
5c
(C)
Display current setting
(C)
(B)
0
0% (Default)
(B)
10
10%
(B)
20
20%
(10% step)
90
90%
(B)
(B)
BS signal delay time setting
5b
(C)
Display current setting
(C)
(B)
0
Delay 0 minute (default)
(B)
_2
Delay 0.2 minutes
(B)
_5
Delay 0.5 minutes
(B)
1
Delay 1 minute
(B)
2
Delay 2 minutes
(1 min. step)
10
Delay 10 minutes
(B)
(next page)



*For details, see 7-1 I/O signal functions.

I/O signal test operation chart



While the signal is being input, these status indications blink and the beep sounds.

5 Maintenance and inspection

For cautions when maintaining the UPS, refer to “Caution (for maintenance)” shown in the “Safety precautions” of the beginning of this manual.

5-1 Checking the battery

The battery used in the unit has a limited lifespan. (The life varies depending on your storage/use environment and backup frequency.)

The nearer the end of the life is, the more rapidly deterioration proceeds.

5-1-1 Battery life expectancy

Ambient temperature	Battery life expectancy
50℃	2.5 years
40℃	5 years
25℃	10 years

*Not a guaranteed performance.

5-1-2 Self-diagnosis test

This test performs a failure diagnosis on the unit and performs a test to check for battery deterioration.
Use the procedure below to check whether a circuit failure has occurred inside the unit and whether battery replacement is required.

There are two, automatic testing and manual testing, in the self-diagnosis test as follows.

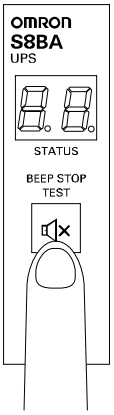
■ Automatic testing

The self-diagnosis test is automatically performed at the factory settings, at the following timing in the state that the UPS is connected to a commercial power source and the charge of the battery has been completed. User’s operation to start the test is unnecessary.

- When the UPS is started up by pressing the “Power” switch
- When power has been supplied for four weeks

If the battery is not sufficiently charged, the self-diagnostic test is not performed. The test is automatically performed when the battery is charged completely.

■ Manual testing



Press and hold the “Beep Stop/Test” switch of the UPS for 5 seconds or longer. When the beeper begins to sound intermittently, release the switch.

If the battery is not sufficiently charged, the self-diagnostic test is not performed. The test is not automatically performed even when the battery is charged completely.

By performing the self-diagnosis test, backup operation is started automatically. (“FU” is displayed during test.) After the test is completed, UPS automatically returns to the normal operation.

Reference

When the battery replacement alert “bn” is displayed, the battery needs to be replaced. Perform replacement by taking the procedures in “5-1 Checking the battery” and “5-2 Replacing the battery”.

5-1-3 Estimated backup time

The backup time varies depending on the capacity of connected devices.
After calculating the total capacity of connected devices, refer to the graph of the backup time to obtain an estimation of the initial value of the backup time. (This is also applied to checking the battery.)

1. Convert the total capacity (power consumption) of the connected devices to watts (W).
The indicator can show values in two different ways: amperes (A), and watts (W).

Example 1: DC24V, 145W
Example 2: DC24V, 1.8A

For devices that use the A indication, convert the capacity into W.

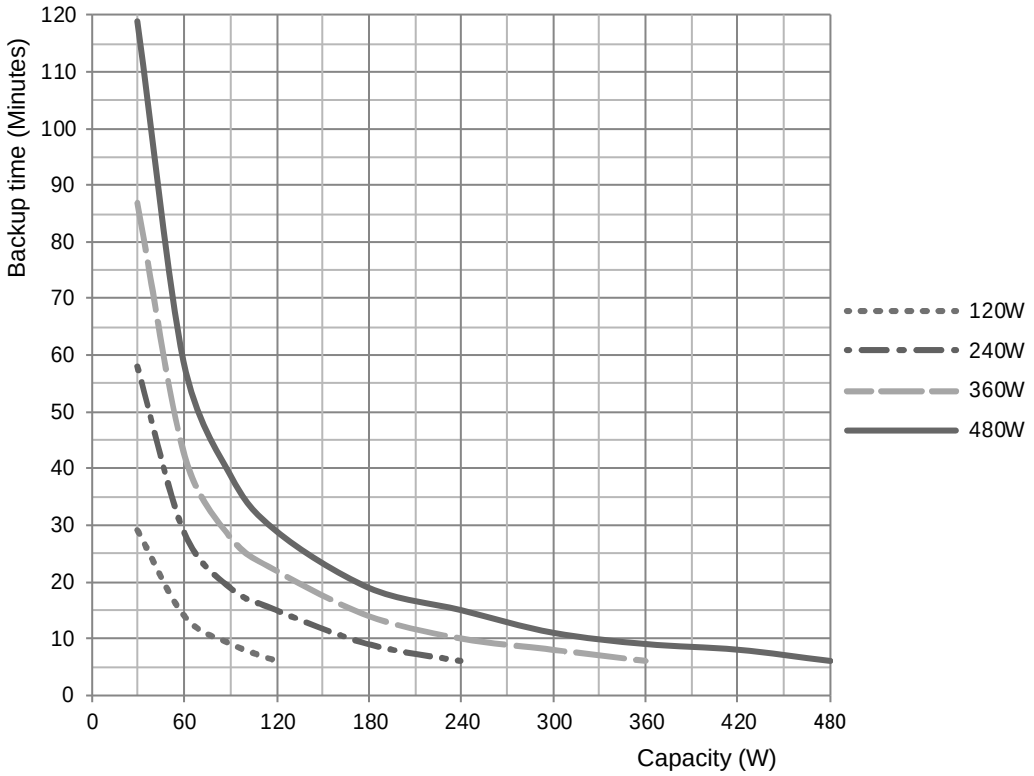
Example : 1.8 (A) = 1.8 × 24 (W) = 43.2 (W)

Indication	Value
A	W = A × 24

2. Add the values converted into W to obtain the total capacity of the connected devices.

3. Calculate the initial value of the backup time for the total capacity of the connected devices from the graph below.

- Graph of backup time (graph of initial values for products that have not been used at 25℃). The backup time becomes shorter than the graph (table) below when temperature is lower.



- The smaller the capacity of connected devices becomes, the longer the backup time becomes.

Backup time table (Time unit: minutes)

Model	Capacity（Watt）									
	30	60	90	120	180	240	300	360	420	480
120W	29	14	9	6						
240W	58	29	19	15	9	6				
360W	87	43	28	22	14	10	8	6		
480W	119	59	39	29	19	15	11	9	8	6

*These backup times are for reference only. Times may vary according to battery life and external environmental conditions (temperature, etc).

5-2 Replacing the battery

This UPS supports hot swapping. Battery replacement is possible both when the power is turned OFF (while the power output is OFF) and when the power is turned ON (while the power output is ON).

Notes

・For battery replacement, hold down the “Beep Stop/Test” switch on the unit for 10 seconds or longer to activate the battery replacement mode. Resetting is complete when “bJ” is displayed.
* Perform a reset with the “input power supply” ON.

If you replace the battery without activating the battery replacement mode, the battery life may not be detected accurately because the battery life counter is not reset.

・Do not replace the battery while the UPS is operating in backup mode. Output will stop.

Reference

・ If an input power supply error such as a power failure occurs when replacing the battery while in operation, backup cannot be performed and output stops.

・ When the battery replacement LED lights “bn” up/blinks and beeper sounds, press the “Beep Stop/Test” switch for 0.5 seconds to stop the beeper. (Lighting/blinking of the battery replacement LED lights “bn” does not disappear.)

5-2-1 Notification that the battery needs to be replaced

When battery replacement becomes necessary, the status indicator starts displaying "bn".

The battery life is determined by the counter function. The battery life counter operates while input power is supplied after shipment. (When the ambient temperature of the battery is higher than 25℃, the value of the counter will be incremented at a faster pace.)

Notes

The battery used in the unit has a limited lifespan. The life varies depending on your use environment and backup frequency.

- The nearer the end of the life is, the more rapidly deterioration proceeds.

The battery deteriorates even if it is stored. The higher the temperature is, the shorter the life becomes.

■ Guidelines for how often to check the battery

Average ambient temperature	6-month check	3-month check
55℃	For the first year after starting use	When 1 year or more have passed after starting use
50℃	For the first 1.5 years after starting use	When 1.5 years or more have passed after starting use
40℃	For the first 3 years after starting use	When 3 years or more have passed after starting use
25℃	For the first 6 years after starting use	When 6 years or more have passed after starting use

5-2-2 Procedure for replacing the battery

For cautions when replacing the battery of the UPS, refer to “Caution for battery replacement)” shown in the “Safety precautions” of the beginning of this manual.

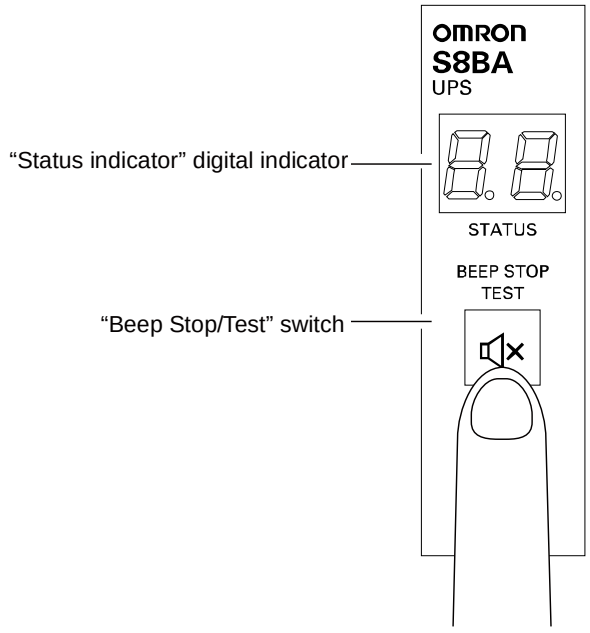
Notes

Be sure to activate the battery replacement mode before replacing the battery.

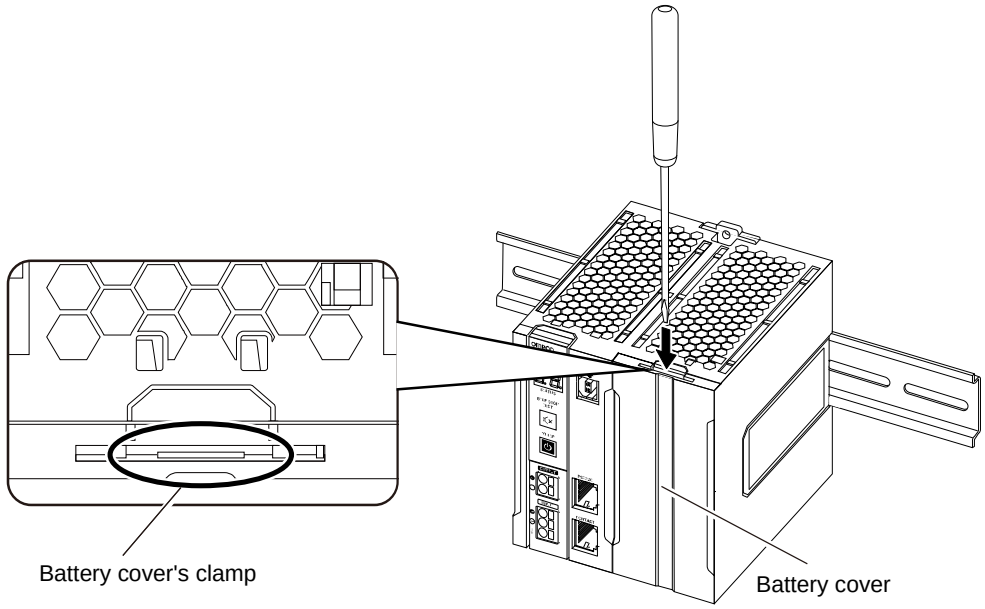
- For battery replacement, hold down the “Beep Stop/Test” switch on the unit for 10 seconds or longer to activate the battery replacement mode. When the battery replacement mode is activated, the battery life counter is reset. If the battery life counter is not reset, a battery deterioration alarm may occur before the expected life of the battery expires.

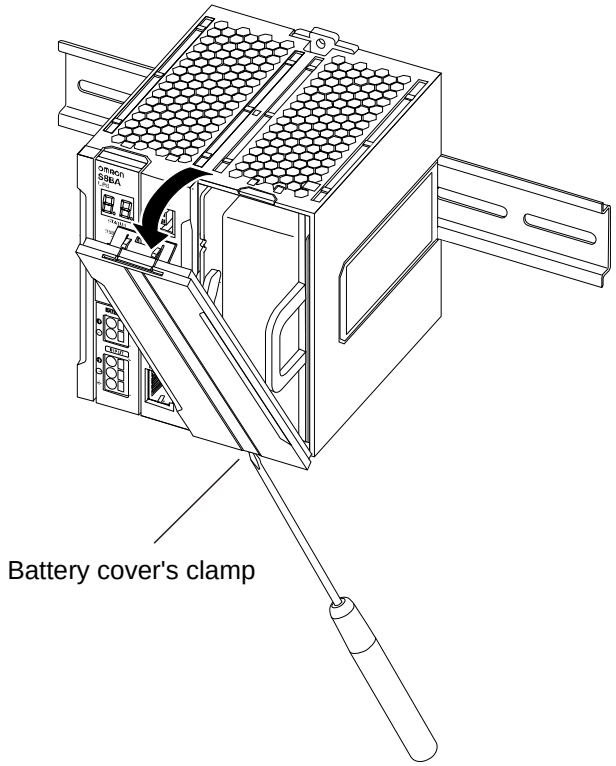
1. For battery replacement, hold down the “Beep Stop/Test” switch on the unit for 10 seconds or longer to activate the battery replacement mode.
When “bu” is displayed, the activation is completed.

- Stopping (“Power” switch “OFF”): When the switch is pressed and the beeper starts sounding continuously, it signals that 10 seconds have elapsed.
- Normal operation (“Power” switch “ON”): When the switch is pressed and the beeper starts sounding continuously after sounding intermittently, it signals that 10 seconds have elapsed.

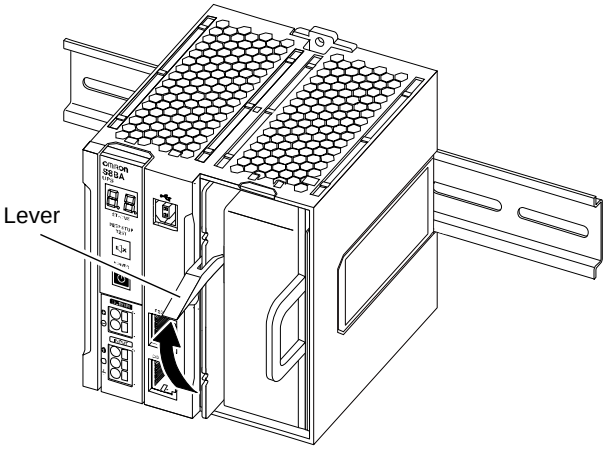


2. Push down the battery cover's clamp with a 5 mm or less blade screwdriver.
Push down also the clamp at the opposite side in the same way and remove the battery cover by pulling it toward you.

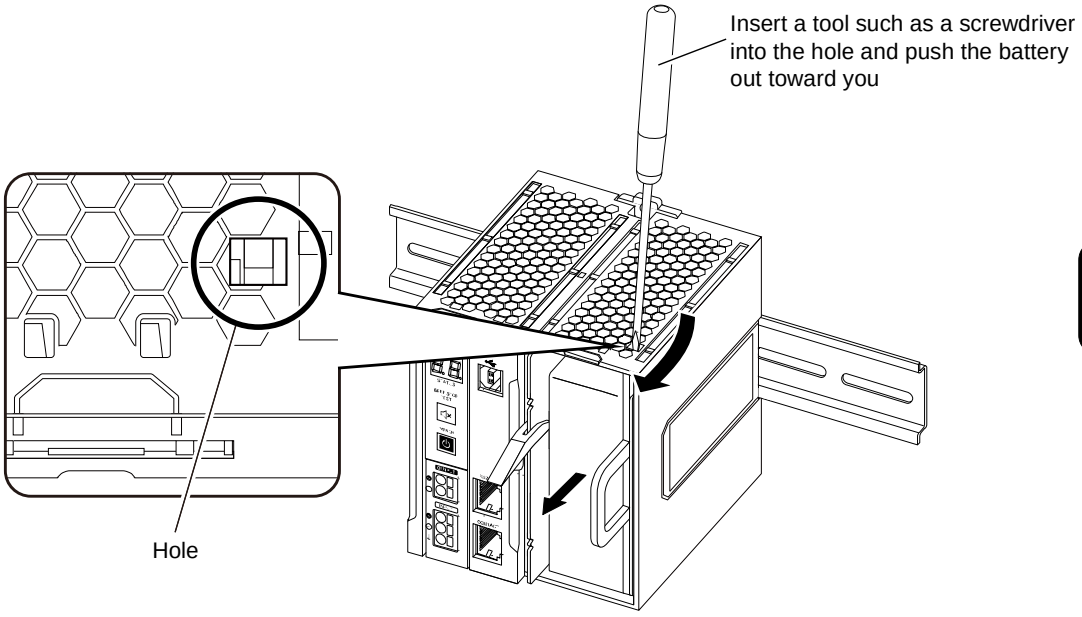




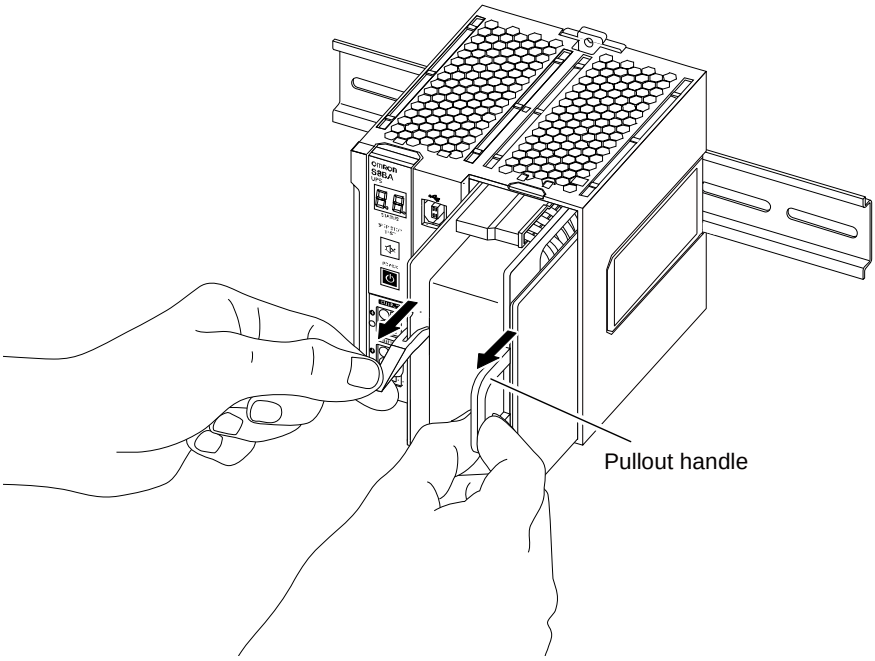
3. Pull up the lever of the battery control board toward you.



4. Insert a tool such as a screwdriver into the hole (the clamp that keeps the battery in place) located on the top of the main body and push the battery out a little toward you.

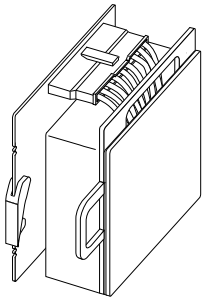


5. Hold the lever of the battery control board and the handle for pulling out the battery pack and pull them to remove the battery pack and control board.

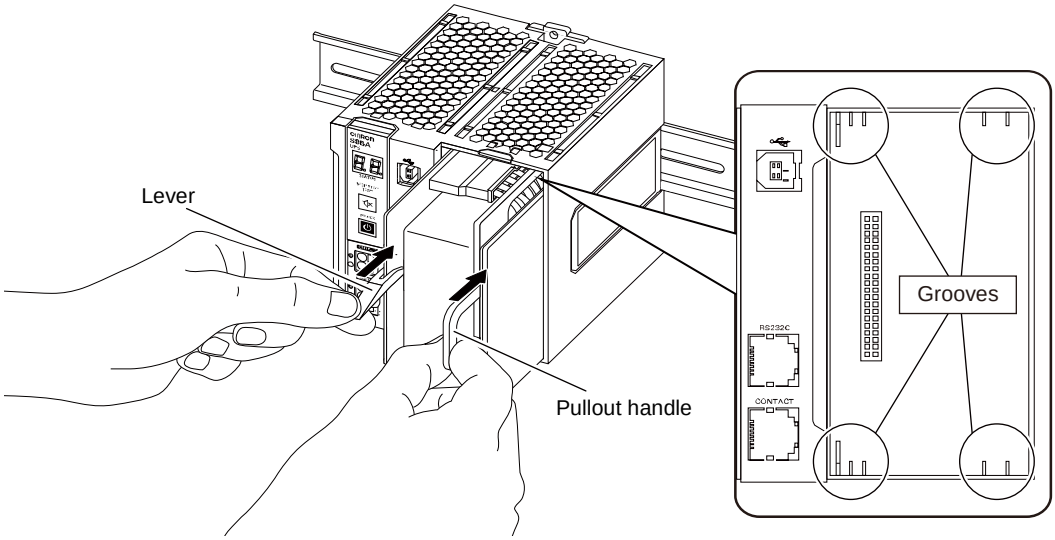


6. Arrange a new battery pack for replacement. Make sure that the new battery is connected to the connector of the battery board in place.

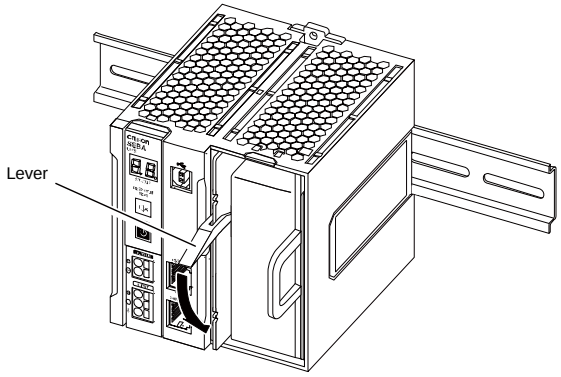
- Replacement battery pack: S8BA-B120L



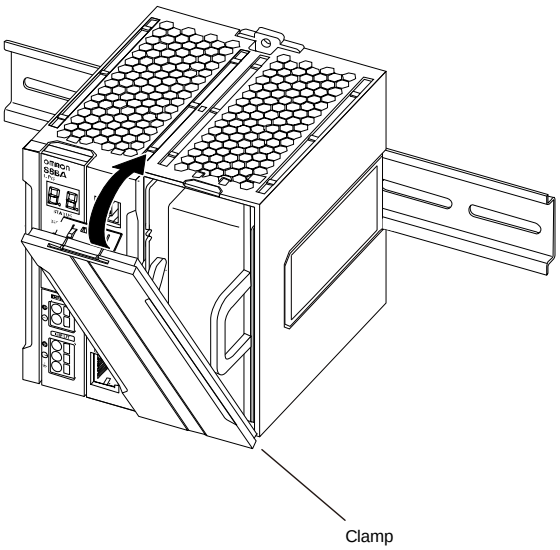
7. Mount the new battery and battery board by inserting them together into the back of the unit. At that time, align the battery and the PCB with the grooves on the main body.



8. Push down the lever.

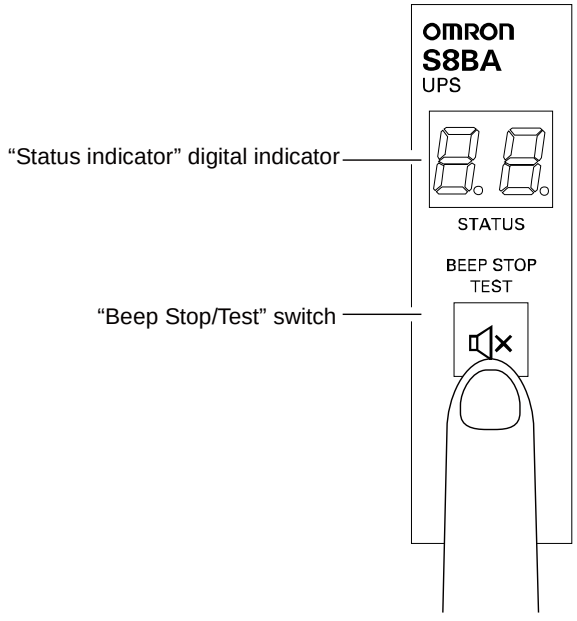


9. Hook the lower clamp of the battery cover onto the main unit.



10. To finish the replacement operation, hold down the “Beep Stop/Test” switch on the unit for 10 seconds or longer to cancel the battery replacement mode.
When “On” or “- -” is displayed, the reset process is completed.

- Stopping (“Power” switch “OFF”): When the switch is pressed and the beeper starts sounding continuously, it signals that 10 seconds have elapsed.
- Normal operation (“Power” switch “ON”): When the switch is pressed and the beeper starts sounding continuously after sounding intermittently, it signals that 10 seconds have elapsed.



Battery replacement is now complete.

5-3 Cleaning

1. Cleaning the UPS

Moisten a soft cloth with water or detergent, squeeze it tightly, and wipe the product lightly.
Do not use chemicals such as thinner and benzene. (They cause deformation or discoloration.)

2. Removing dust from the input terminal block and the output terminal block terminal blocks of the UPS

Stop all the connected devices and the UPS and turn the “input power supply” OFF.
Then, remove dust with a dry cloth and turn the “input power supply” ON again.

*For information on the connection procedure, see “3-2 Connection”.

6 To perform shutdown processing of the devices when a power failure occurs

6-1 The outline on the UPS monitoring software

6-1-1 What is the Simple Shutdown Software

"Simple Shutdown Software" allows you to automatically shut down the PC when a power failure occurs.

For more information, refer to the manual of this software.

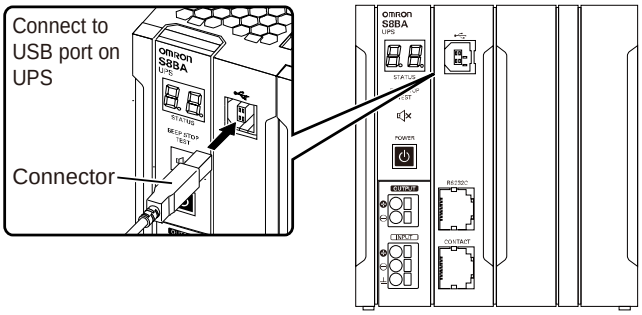
6-1-2 How to connect

1. Connect the UPS to a computer.

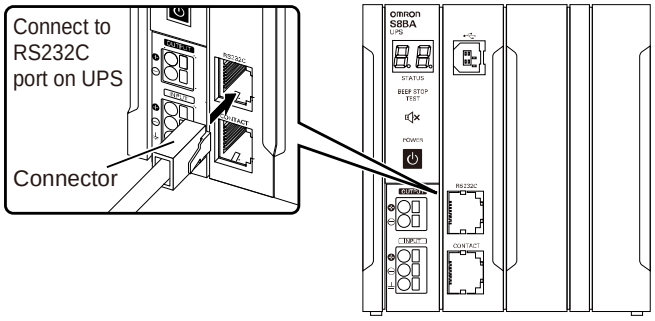
・USB connection: The USB cable that comes with the product can be used.

・RS232C connection: An optional connection cable (S8BW-C01) is required.

● USB connection

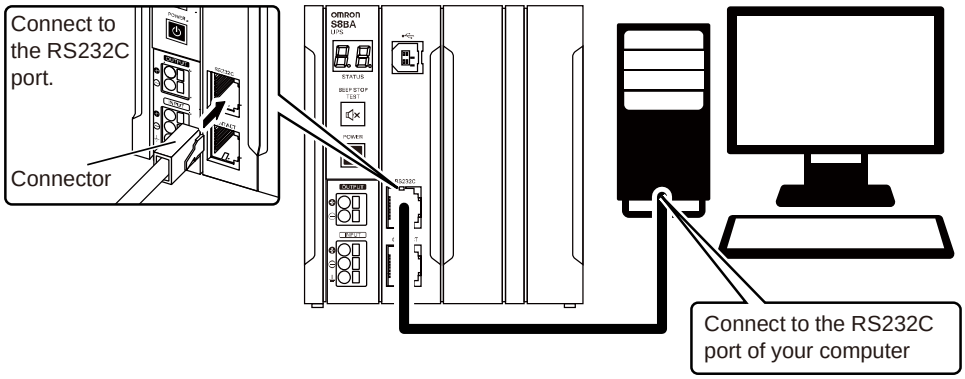


● RS232C connection



2. Install “Simple Shutdown Software” in your computer.

* For details, see the manual for the above software.



● Cable pin configuration

【UPS side】

RJ45		
I/O	**Name**	**F**
		1
		2
O	TXD	3
-	GND	4
		5
I	RXD	6
		7
		8

S8BW-C01		
M	**Connection**	**F**
1		1
2		2
3		3
4		4
5		5
6		6
7		7
8		8
		9

【PC side】

Dsub-9pin		
M	**Name**	**I/O**
1	DCD	I
2	RxD	I
3	TxD	O
4	DTR	O
5	SG	-
6	DSR	I
7	RTS	O
8	CTS	I
9	RI	I

Notes

When the power is restored while auto shutdown processing is being performed

- If a power failure occurs and then the power is restored while auto shutdown is still in progress, UPS output will stop temporarily after the set time elapses.
  After shutdown is finished, do not turn on the computer until the UPS has finished restarting.

7 Using the I/O signal functions

7-1 I/O signal functions

● About contact signal

You can develop your unique system based on the following specifications to automate the process at a power failure. You can perform power-failure processing by allowing the system to detect the backup signal (BU) and also perform system shutdown processing by allowing the system to detect the low battery level signal (BL). Also, by inputting the backup stop signal (BS) from the system, you can stop the UPS with a sufficient battery level to prepare for the next occurrence of a power failure.

7-1-1 Type of output signals

The UPS has 4 kinds of output signals.

The output circuit consists of an open collector circuit using a photo coupler.

Signal	Description
Backup signal output (BU)	Stays ON during backup operation at a power failure.
Low battery level signal output (BL)	Goes ON when the battery becomes weak during backup operation at a power failure.
Trouble signal output (TR)	Goes ON when an internal failure of the UPS occurs or when the battery life counter expires.
Battery replacement signal output (WB)	Goes ON when the test determines that battery replacement is necessary due to deterioration or when the battery life counter goes off-scale.

7-1-2 Type of input signals

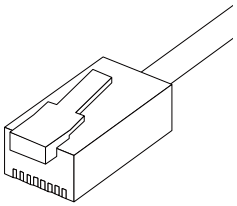
The UPS has 2 kinds of input signals.

Signal	Description
Input of the UPS stop signal (BS)	When the BS signal is ON (High), the output of the UPS is stopped after the time period specified in advance has elapsed*.
Remote ON/OFF signal	Remote ON/OFF signals can be used to start and stop the UPS, by using either an externally connected contact or the ON/OFF status of the open collector circuit. When signal is OFF, the UPS will be turned on. When signal is ON, the UPS will be turned off. In the factory settings, the UPS stops operation when this is short-circuited. In addition, it is necessary to turn on the “Power” switch of UPS to use this function.

*BS signal delay time

It is possible to set the period of time from when a BS signal is received until the output of the UPS is stopped. The output of the UPS can be stopped by inputting the voltage signal (High).

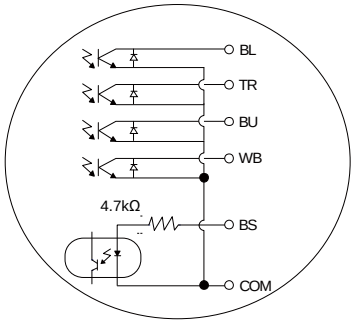
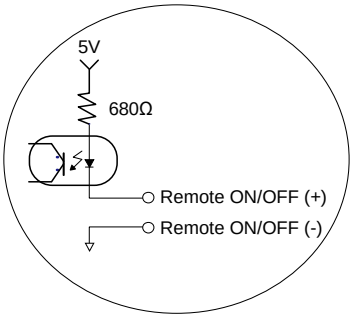
7-1-3 I/O signal port (RJ45 connector)

Outlook of the connector	Pin number	Item
	1	Backup signal output (BU)
	2	Remote ON/OFF input (-)
	3	Trouble signal output (TR)
	4	COMMON (COM)
	5	Battery LOW signal output (BL)
	6	Backup stop signal input (BS)
	7	Battery Replacement Signal output (WB)
	8	Remote ON/OFF input (+)

7-1-4 Contact signal ratings

Signal	Description
Signal output (BL, TR, BU, WB)	・Photo coupler ratings ・Applicable voltage: DC50V or less ・Maximum current: 360mA
Remote ON/OFF input	・Voltage between terminals: DC5V ・Current when closed: 10mA max.
UPS Stop Signal input (BS)	・Input voltage: HIGH(ON) DC 8 to 24 V LOW(OFF) DC0.5V or less ・Input current: 1.7 to 5.1mA

7-1-5 Contact signal circuit

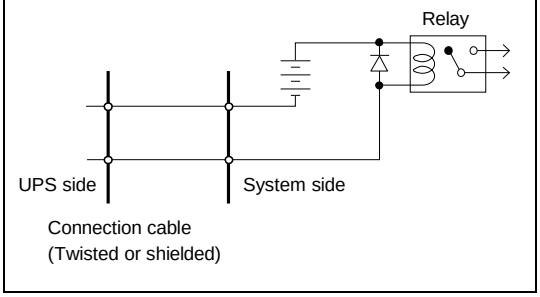
Signal output (BL, TR, BU, WB) UPS Stop Signal input (BS)	Remote ON/OFF input
	

7-1-6 Precautions and notes for the use of the I/O signal functions

Notes

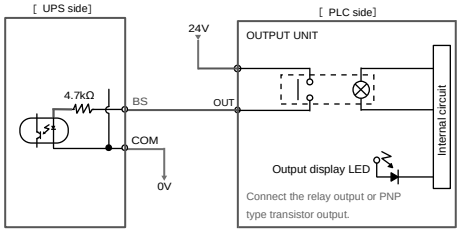
When connecting a device such as a relay that generates counter electromotive force to the signal output circuit, connect diodes that prevent counter electromotive force to both ends of the relay.

Example of BU signal output circuit and the connected circuit

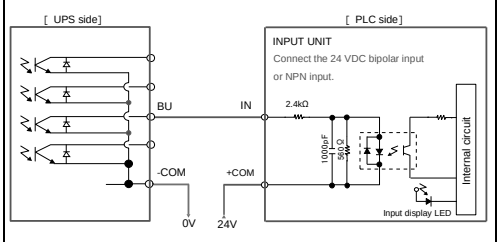


7-1-7 Example of the use of the Contact Signal circuit

BS signal example of connection with PLC



BU signal example of connection with PLC



8 Troubleshooting

Perform the checks shown below if the unit is operating abnormally.

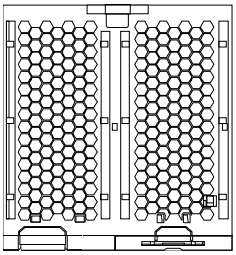
Problem	Check and remedy
The unit does not start operation. The LED does not appear when the AC input is connected to commercial power and the “Power” switch is turned ON.	Make sure the AC input is securely connected to commercial power. If the status indicator does not display properly after you perform the above operation, there is a problem with the unit. See “4-3 Interpreting beeps and displays”.
Backup is not possible. The computer stops when a power failure occurs.	The battery may not be fully charged. Perform the test after charging the battery for at least 4hours. The battery can be charged just by connecting the AC input to a wall outlet. The “Power” switch can be either ON or OFF. When input power supply is connected to the unit and the power is turned ON, battery charging operation starts. When the “Power” switch is turned OFF, the battery charging operation does not start.
Backup is performed too frequently. Frequent switching is performed although a power failure does not occur. You hear the sound of switching.	Variations (decrease) in the input power occur frequently. Or, noise may be included that significantly distorts the voltage waveform of the input power. ・Try and check what happens when connecting the unit to a different wall outlet (commercial power) located some distance away from the device consuming a large amount of power. ・This problem may occur also when you connect many devices to a plug strip or extension cord connected to the UPS if it is a long or thin cable.
The power is not turned ON even when the “Power” switch is pressed.	If the status indicator displays “H-” or “L-”, check the voltage of the input power supply.
The battery replacement alert “bn” is displayed.	・Battery replacement alert “bn” blinks: The battery is judged to be deteriorated in the self-diagnosis test. Backup operation lasts only for a short period of time. Replace the battery. See “5-1 Checking the battery”. ・Battery replacement alert “bn” turned ON: The battery life counter has counted up to the limit. The battery has been used up to its end-of-life. Replace the battery. See “5-2-1 Notification that the battery needs to be replaced”.
The UPS life alert “Un” is displayed.	The UPS has been used up to its end-of-life. Replace the UPS with a new one as soon as possible.
The status indicator shows “OL”, and the beeper sounds at 0.5-second intervals.	There are too many connected devices. Reduce the number of connected devices until “On” is displayed on the status indicator.
The status indicator blinks “E0”, and the beeper sounds continuously.	Output stopped due to exceeded connection capacity. Turn OFF all power to the unit and connected devices, and reduce the number of connected devices. Then, turn the power to the unit and connected devices back ON and check whether “On” is displayed on the status indicator.

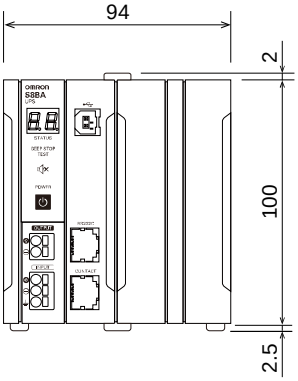
9 References

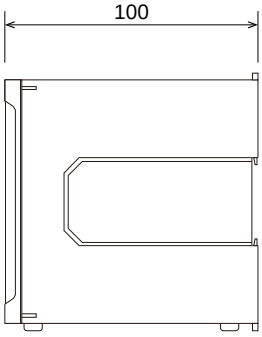
9-1 Dimensions

*Unit: mm / Tolerance:±1mm

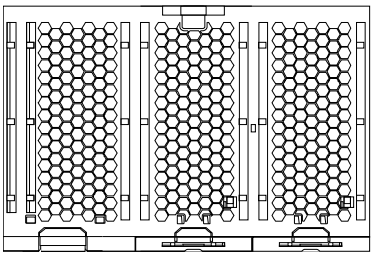
■ S8BA-24D24D120LF

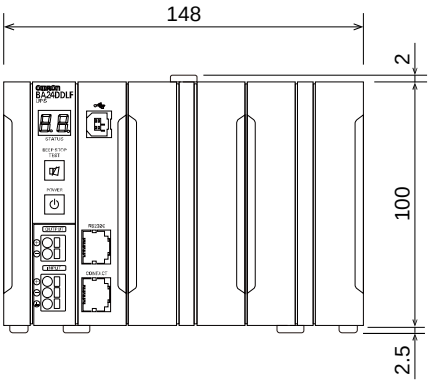


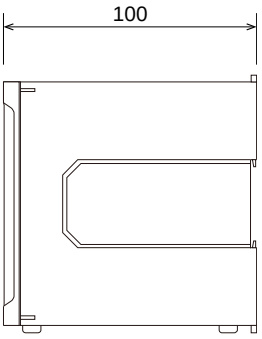




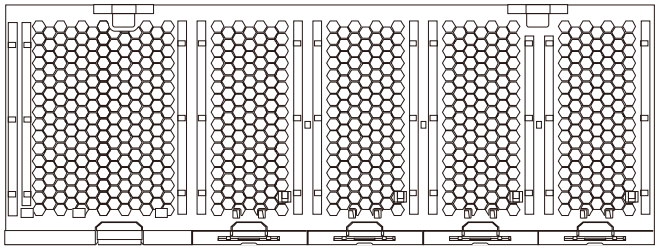
■ S8BA-24D24D240LF

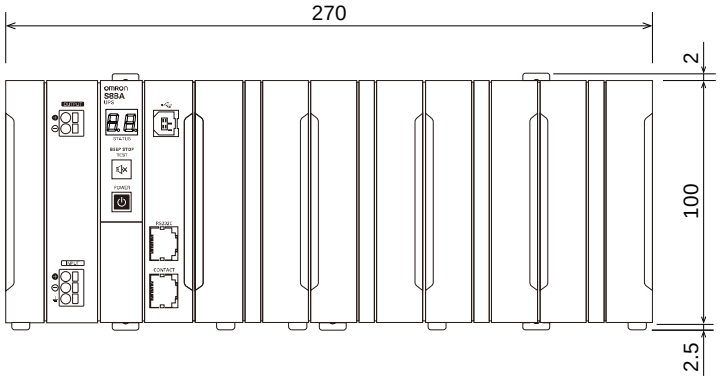


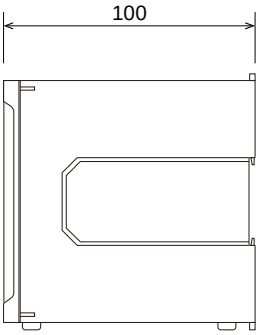




■ S8BA-24D24D360LF／S8BA-24D24D480LF

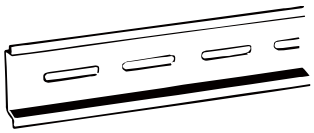


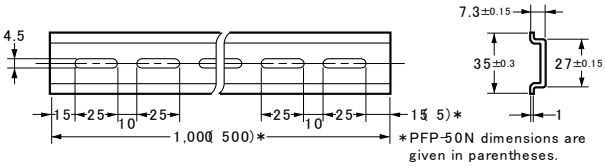




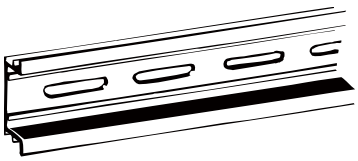
■ Optional items for rail mounting

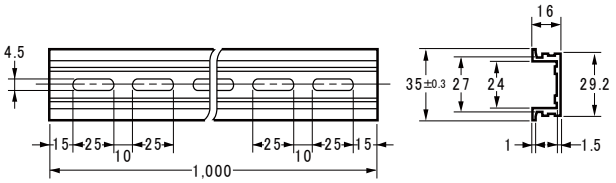
●Support rail (Alminum)
PFP-100N
PFP-50N



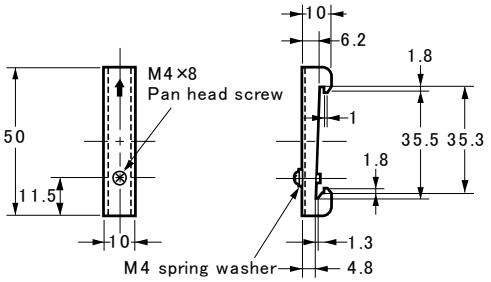


●Support rail (Alminum)
PFP-100N2





●Fastening plate (End plate)
PFP-M

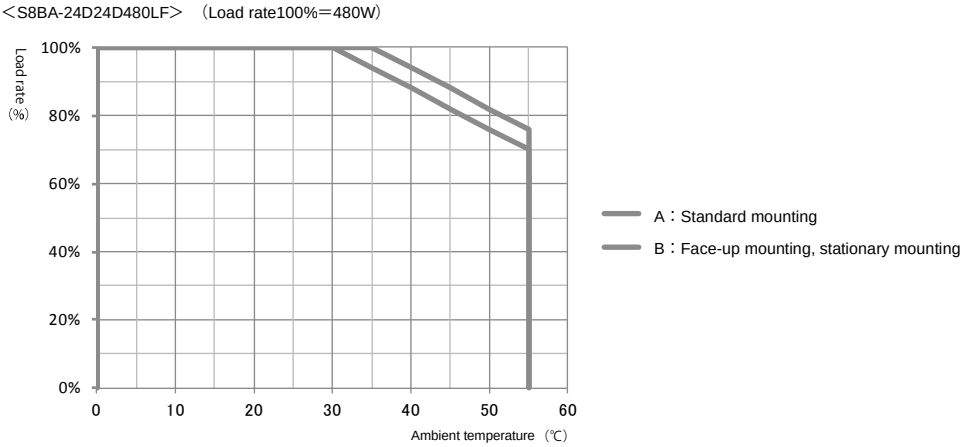


Note 1: If the DIN rail is subjected to vibration or shocks, scrap metal can be produced because of aluminum abrasion. In such a case, use a steel DIN rail instead.

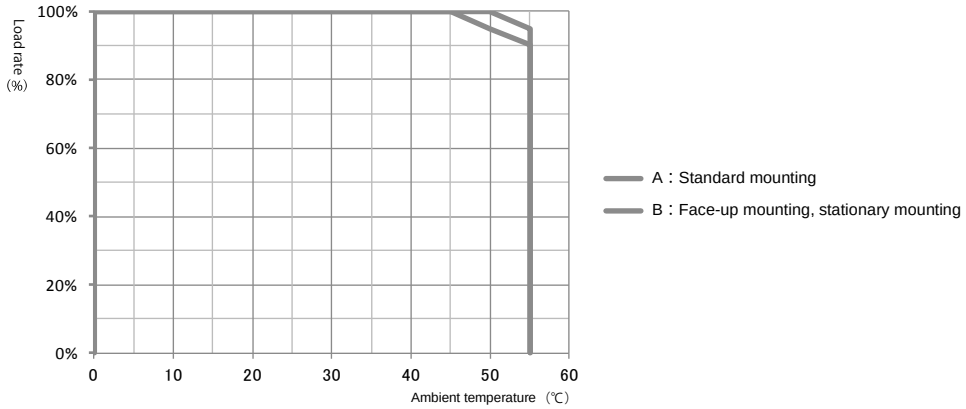
Note 2 : If the product slides sideways, attach an end plate (PFP-M) on both sides of the main body.

9-2 Characteristic data

● Derating curve (Use as a non-UL compliant device)

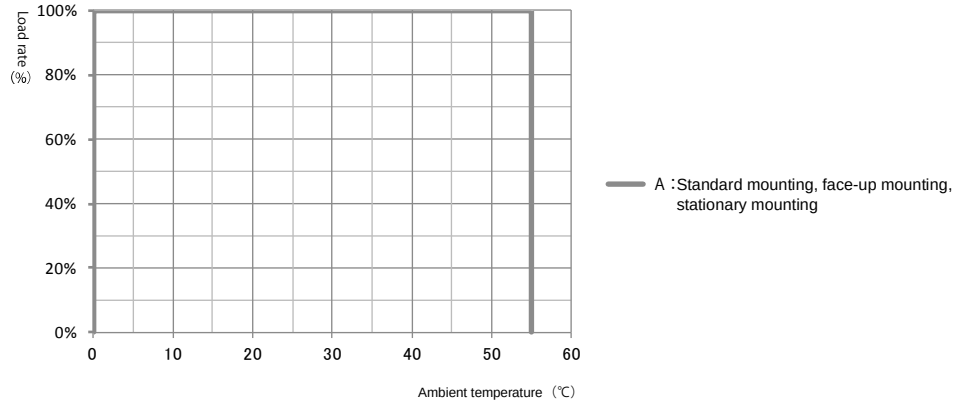


＜S8BA-24D24D360LF＞ （Load rate100%＝360W）



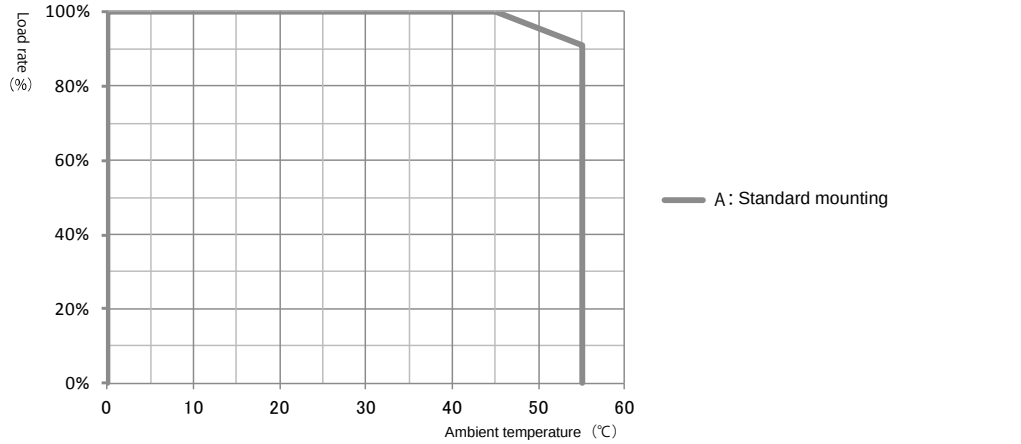
＜S8BA-24D24D120LF＞ （Load rate100%＝120W）

＜S8BA-24D24D240LF＞ （Load rate100%＝240W）

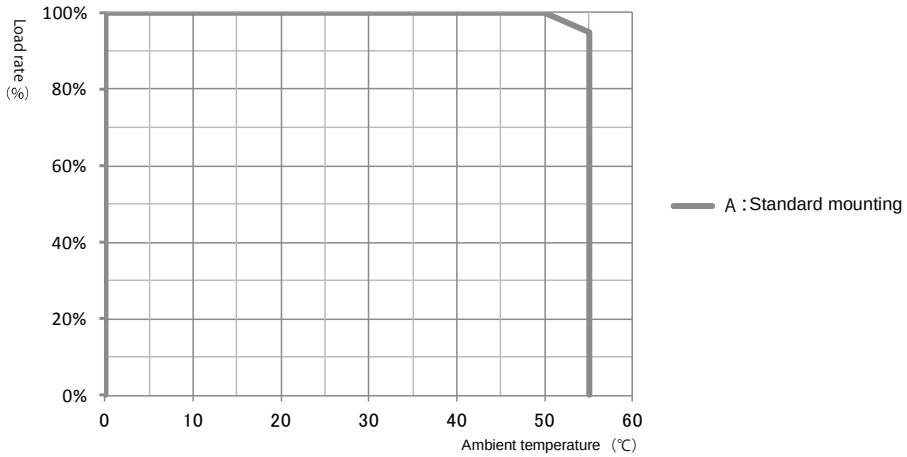


● Derating curve (Use as a UL compliant device)

＜S8BA-24D24D480LF＞ （Load rate100%＝400W）

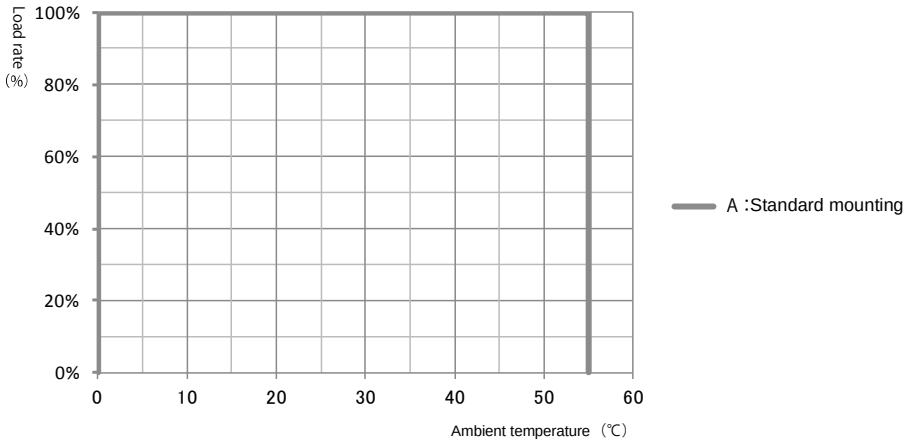


＜S8BA-24D24D360LF＞ （Load rate100%＝360W）

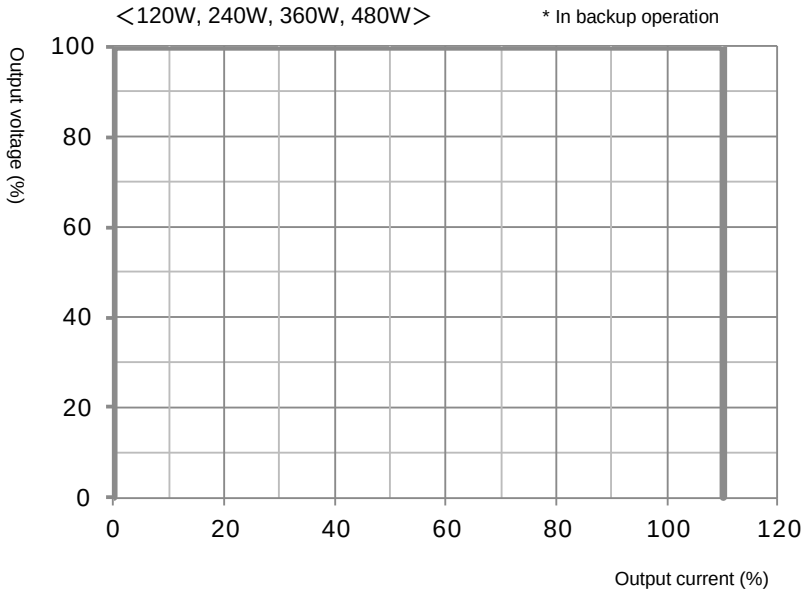


＜S8BA-24D24D120LF＞ （Load rate100%＝120W）

＜S8BA-24D24D240LF＞ （Load rate100%＝240W）



● Overcurrent protection curve



*1 In backup operation, the output voltage drops at a load rate of 110% or highe r.

*2 In normal operation, the output stops when the input protection fuse blows out.

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